

THE
BRITISH PALLADIUM:

OR,

Annual Miscellany

OF LITERATURE and SCIENCE:

For the BISSEXTILE-YEAR 1772.

The *First Part* containing *New and Select* SUBJECTS, of general Use.

The *Second Part* consisting of *Answers* to the former Year's Enquiries;
with *new and curious Enquiries* for the present YEAR.

To which are added,

CHRONOLOGICAL RULES, with an *Alphabetical CHRONICLE*.

For the Use of Gentlemen and Ladies, Youth at School, and Navigators.

Serving both for Land and Sea.

The *Twenty-fourth* Number published.

With which may be had, *The Seaman's Guide to the Longitude, or Key to the Nautical Ephemeris*, just published.

By the AUTHOR of the *Improved ROYAL ASTRONOMER AND NAVIGATOR*.



Your well-receiv'd Palladium still appears,
Its Fame encreasing with encreasing Years;
For Use applauded, and for Arts approv'd,
For Worth regarded, and for Truth below'd.

L O N D O N:

Printed for D. STEEL, Bookseller, on Little-Tower-Hill,
MDCCLXXII. Price One Shilling.

THE BRITISH PALLADIUM, OR INTRODUCTION.

Concerning CHRONOLOGY, or The ACCOUNT of TIME.

Inter Annos quærere Verum.

TO render our *Palladium* as extensively useful as possible, we have, this Year, begun to insert our *Alphabetical Chronology* of the most memorable and remarkable Events, happening in the several Ages of the World; which (with other *interesting* Subjects) we design to continue *annually*, in different and successive *Alphabetical CHRONICLES*, marked I. II. III. &c. for Reference, and reducing some of them into *Chronological Classes*. And, as our *principal* View is Truth, and the *general* Improvement of useful Science, we shall esteem it a particular Favour done us, by our *judicious* Readers and Correspondents, if they will furnish us with the *Correction* of such Matters as shall happen to be found *defective*; and of such *Dates* as shall happen to deviate from the *best Authorities*, when compared therewith; especially with the *leading Authorities* and established *Periods* of remarkable *Events*, in the Table of *successive Chronology*, inserted in *Palladium*, 1764, P. 79 and following. Their Improvements and Corrections, with their *Names*, shall be inserted in future *Palladiums*, in Honour of their Discoveries and Merit.

Of *Antient* CHRONOLOGY.

So uncertain was *antient* Chronology, before Sir *Isaac Newton* reformed and corrected it, (*see his Chronology*), that the Time of some *Events* differed from the Truth some *Hundreds* of Years, when he adjusted the *Mistakes* of Chronologers by his *accurate* Reasoning and Judgement. But, notwithstanding his *generous* Reformation of *antient Chronology*, we find that several *Champions* for Error, with their *Advocates*, have commenced Hostilities against this *great Author's Conclusions*; particularly the Rev. Dr. *Rutberford*, Regius Professor of Divinity in the University of *Cambridge*, who attacks his Account of the *Argonautic Expedition*, on which his Reformation of Chronology is founded; and the no less redoubted *Champion* for Error, Dr. *Bedford*, taking the Part with 4 Bishops, opposed Sir *Isaac Newton's* Arguments and Conclusions; but these Leaders and their Host of Followers (like *Lucifer* and his *Legions* making War against Heaven) have been totally defeated by the *invincible Artillery* of Mr. *Emerson*, (at the End of his Comment on Sir *I. Newton's Principia*, in Defense thereof, his *Optics* and *Chronology*), who has discomfited them, *one and all*, and covered them with Shame and Confusion.

Of *Modern* CHRONOLOGY.

Our modern *Chronologers* are not agreed about the true Year, or *Epocha*, of Christ's Birth, on which the true *Æra* or Reckoning of Christ depends; and, consequently, other *Æras* depending upon it; some making the Birth of Christ 4 Years before the vulgar *Epocha*, or Time. This they deduce from the Computation of a *lunar Eclipse*, which *Josephus* tells us happened a little before (without saying how much) the Death of *Herod the Great*, in whose Time our Saviour was born. The Time of which *Eclipse* is computed by *Kepler*, and by *Whiston* our Countryman; who, in his *Astronomy*, makes it happen, *March 12^d 15^h*, with which *Brent*, in his *Astronomy*, agrees; being on *Monday, March 13^d*, at 3^h Morning, *Julian Style*; 4 Years before the Beginning of the vulgar *Epocha*. But *Nicholas* (not *Michael*) *Man*, Esq. late Master of the Charter-house School, *London*, in his *Chronology*, makes the true Year of Christ's Birth just 6 Years before the common Year. Mr. *Emerson*, in his *Chronology*, (from Sir *Isaac Newton's* Principles), sets down the Time only 2 Years before the common Year; whose Judgement and Reasoning running in a Parallel with Sir *Isaac Newton's*, his *Epocha* of Christ's Birth is the most to be

be relied on. For an *Eclipse* of the *Moon* may happen, for many Years together, preceding a little (*more or less*) the Death of *Herod*, or Birth of *Christ*, in one or other of the Calendar Months of different *Julian* Years. As to Calculation, though the different Accounts of Time, preceding the *Julian* Account, confuse it, yet any *Phænomenon*, happening in *Antiquity*, being reduced, from any Form of reckoning Time, to that of the *Julian Period*, (invented by *Scaliger*), may thence be reduced to that of the late uniform *Julian Style*, or even to the present *Gregorian* Form of reckoning Time. Either of which *Forms* (though there was no *Julian* Account before the Year 46 preceding, nor since the Year 1752, after, *Christ*) may be carried back, as far as we please, (see our *Royal Astronomer*), for proving the Time of any *Event*, or *Phænomenon*, related in *History*; due Regard being had to the *Changes* of reckoning Time, the *Points* of Change, and *Continuance* of each; with the *lunar* Years and Years of *Confusion*. From the Neglect of *Chronologers*, in observing and noting these *Incidents* as they happened, proceeded numerous *Errors* in *Chronology*, and much *Confusion* in fixing the Time of *Events*. Whereas, had the Account of Time been continued by the *Ægyptian* Year of 365 Days, the *Julian* Year since, of 365½ Days, or the *lunar* Year of 354 Days, a great Deal of *Error* and *Confusion* in *Chronology* had been prevented; being the *fittest* Forms of reckoning Time for Calculation; provided one Time had been always kept for a Year.

The *lunisolar* Year, of 360 Days, the most antient Year of all, consisted of 12 *Lunations*, or Months, of 30 Days each; which falling short of the true *solar* Year of 365 Days, 5 Hours, 48 Minutes, 55 Seconds, the *Antients* added a Month, when they found their Account of Time fall short of the *Seasons*; and omitted a Day or two in an *intercalary* Month, when they found it longer than the Course of the *Moon*. A *lunar* or *synodical* Month contains 29 Days, 12 Hours, 44 Minutes, 3 Seconds; 12 of which Months making the mean *lunar* Year 354 Days, 8 Hours, 48 Minutes, and 36 Seconds, instead of 354 Days reckoned; being 10 Days, 21 Hours, 0 Minutes, 18 Seconds, short of the *solar* Year. But these and other *Shiftings*, in the antient and different Accounts of Time, are so many contributing Causes to the *Confusions* and *Uncertainties* of *Chronology*, requiring the Sagacity of a *Newton*, or an *Emerson*, to correct.

The 12 Months of the Year, before the Time of *Julius Cæsar*, consisted, alternately, of 29 and 30 Days in Succession; making the *lunar* Year (of 354 Days), or *lunar* Account of Time, uniform; by which *Contrivance*, the new Moon, when once properly adjusted, kept to the 1st Day of every Month. And the Year, in those Days, always begun with the new Moon nearest the vernal Equinox. But *Julius Cæsar*, afterwards, ordered the Months, alternately, to consist of 31 and 30 Days each, from the 1st Month, *March*, of 31 Days, in Succession, to *January* of 31 Days; ordering *February*, the last Month, to consist of 29 only; but in *Leap-Year* of 30 Days. This *Julian* Year was thus kept uniform, till *Augustus Cæsar* altered it, and ordered, for no sufficient Reason, *August* to consist of 31, instead of 30, Days, as formerly; and *February* of 28, instead of 29, as before his Time, and 29 Days in *Leap-Year*; making (as it were) two *Beginnings*, at the 1st of *January*, and at the 1st of *March*; where there are two Changes of the Order of the *Dominical* Letter, and of all Things depending on it, as observed by Mr. *Emerson* in his *Chronology*. Who farther observes the manifest *Absurdity* of thus dividing the Year into two *Fragments*, governed by different Rules. First the *Absurdity* appears of introducing a Day into the Midst of a Year, without Room or Occasion for it; and then into the Midst of a Month, by reckoning the 24th of *February* twice; as if one Day could be two, or two Days could be one. To, partly, get rid of this *Absurdity*, used in the Times after *Julius Cæsar*, this *intercalary* Day was, in *England*, introduced at the End of *February*; where it had come in properly, if our late *Style-Act* had, for greater Advantage, ordered

THE BRITISH PALLADIUM, OR

March, in which happens the *vernal Equinox*, to be the first Month, and *February* (the rest in Order) the last Month of the Year. But because other Nations in *Europe*, improperly, keep their Account of Time according to *Augustus Caesar's* and *Pope Gregory's* Establishments, (the latter making a *Decree* against the Earth's Motion), we, to correspond with their Accounts, follow their Example, in the *Improprieties*, that *Augustus Caesar* first, and then *Pope Gregory* afterwards, imposed on all *Christendom* to observe. But his Holiness had done better, if he had rectified the *civil Year* to the Time of *Christ's* Birth, when the *Epocha* of his *Æra* began, and when the *vernal Equinox* was on the 24th or 25th of *March*, and not from the Date of the Council of *Nice*, when the *vernal Equinox* was on the 21st of *March*.

The *Protestant States of Germany*, wisely rejecting the *Pope's* Mandate, when they altered their *Calendar*, ordered 11 Days to be left out of *February* in the Year 1700; directing *March* the 1st to be reckoned instead of *February* the 19th. Who directed, that the Time of *Easter* should be observed on the first Sunday after the first full Moon after the *vernal Equinox*: Or on the Sunday next after, when that full Moon fell on a Sunday. To be determined by astronomical Calculation. Which Rule has the Advantage of the Rule in our *Act* for Truth, that differed from the Table in the *Style-Act* itself, in the Year 1761, (as observed by Mr. *Emerson* in his *Chronology*), by a Month later, (and more of the like Instances may happen), occasioned by the *Act*, making the *vernal Equinox* constantly on the 21st of *March*, that happened on the 20th in 1761: And, notwithstanding our Rule, in the said *Act*, was prejudged by our then *Astronomer Royal*, and others eminent for their Skill in *Astronomy*, these Mistakes happen.

Since Mr. *Emerson* has told us, that the *Passion of Christ* (see his *Chronology*) was, probably, on *Friday*, the 14th of the *Jewish* Month *Nisan*, which reduces to *Friday*, *April* the 23d, *Julian Style*; when the *Equinox* was on *March* the 24th, but now on the 20th of *March*, or 4 Days sooner; if the *Passion* then is reduced to the present Date of *Christ*, it will fall (as Mr. *Emerson* observes) on the 19th of *April*; and the *Resurrection*, two Days after, on the 21st of *April*, exactly, in the same Season; which is all required for commemorating so distinguished and remarkable an Event. And therefore if (as Mr. *Emerson* observes) the nearest Sunday to *April* the 21st had been directed for commemorating *Christ's Resurrection*, or observing *Easter*, the Rule had been easy, certain, and sufficient, without perplexing so many Judgements, and such a Confusion made about it, for projecting a Rule, involved in Doubts and Difficulties, and farther from the Truth.

It had been another Advantage, if the original Form of the *Julian Year* had been continued. The Year to begin with *March*, wherein the *vernal Equinox* happens; where all astronomical Computations begin. The *intercalary Day* to come in properly at the End *February*, the End of the Year, without the *Dominical Letter's* being interrupted, as in the present Account. One *Dominical Letter*, beginning at *March* and ending in *February*, would have served for every whole Year. In *Leap-Year*, *February* would have contained 30 instead of 29 Days in the common Year; and the Succession of 31 and 30 Days, alternately, in each Month, from *March*, had been completed and ended in *February*, at the Year's End. And adding 1 Day for every Month past *March* to the Day of the Moon's Change in *March*, would have shewn the Change in the present Month.

The *Gregorian Alteration of Style*, 1752, in *England*, might, this Way, have taken Place with more Advantage than at present, by making every *Hundredth Year*, not divisible by 4, to be *Leap-Year*; improving it with the Rule for finding *Easter*, continually, by the nearest Sunday to *April* the 21st, as the Season stood at *Christ's* Resurrection. But Mr. *Emerson* remarks, that 7 Days might have been added, by *Act* of Parliament, to the Month-day, once in 1000 Years;

Years; which would have best come in to end with the Year. Who justly observes, that *shifting* the Year so often, to agree so exactly with the *Seasons* and with the Fall of *Easter*, the *Holidays*, *Law-Terms*, *Fairs*, &c. (which kept near the same Season, once a Year, is sufficient; or why is *Christ's Nativity* commemorated on the 25th of *December*, whose Birth is calculated, as aforesaid, to have happened on *Monday, March 13^d 3^h, Morning?*) is like *shifting* the Fire to a Person, to save him the Trouble of going to it. Or, it may be compared to hoisting up Horses, or lowering them down, by *Tackles*, to feed upon the Grass growing on *Eminences*, or *Declivities*, instead of cutting it down and bringing it to them.

So, likewise, among the *modern Schemers* for discovering the *Longitude*, we find (since the Time of Sir *Isaac Newton* and Dr. *Halley*) that those Persons have been most authorised to judge of the *best Methods* for that End, by *Sea* and *Land*, who are *least* qualified in *mathematical Science* and *Calculation*. Mr. *Emerson's* Judgement was never consulted in the most important *Decisions* for this Nation, where the utmost *Genius* and *Abilities* of an universal *Mathematician* were required. But the Judgement of *inferior Calculators*, connected with *University Professors*, has (*brought Favour and Interest*) been preferred, as to the *best Means* of discovering or improving the *Longitude*, though hitherto failing. As if the *Talents* of real *Mathematicians* (since the Days of the illustrious *Gregory*, *Keil*, *Halley*, *Barrow*, *Newton*, *Cotes*, *Saunderson*, &c. Men of *Genius* and real Science) and *Connections* with *Oxford* and *Cambridge* were inseparably united. The contrary of which appears, in *Mayer's astronomical Tables*, published according to his original Error, by the *Conductor general of Longitude*, 1 whole Year erroneous in *Chronology*. For this reverend *Conductor* has represented the Year of *Christ's Birth* (which is truly expressed *Anno Christi* 1) by a Cypher, 0, as a Year of *Non-Entry*; which 0 Year of *Christ* (as 1st Year before, and 1st Year since, *Christ* came together) is in Place of 1st Year before *Christ*, it being Leap-Year. Consequently, the reverend *Conductor* must alter or reprint his 100, 200, 300, &c. Years before *Christ*, represented for Leap-Years, (which are not so), to 101, 201, 301, &c. before *Christ*, which are truly Leap-Years.

The Rules and Schemes of *Longitude* by the same *Conductor-General* and his *Aids de Camp*, for executing that high Office, in discovering the *Longitude*, (*— Palmaque nobilis — evitata Rotis — evebit ad Deos*), — are all truer in Theory than in Practice.

PALLADIUM-AUTHOR.

☞ The Age of the Moon at the Beginning of the Year is the *Epa*. The Number of Days, between *March* the 21st to *Easter-Sunday*, is called by some the Number of *Direction*. — See the *Chronological Rules* and *Chronicle* farther on.

Advertisement. To the P. A.

THE Rev. Mr. *Piper*, Non F. R. S. formerly wearing a *Silver-Call*, when *Boatswain* of the *Sea Horse*, having lately taken his Degree as a *Methodist Parson*, with his utmost Pains and Attention has lately discovered the *Philosopher's Stone*, for turning all *metallic Substances* into *Gold*; which he entirely performs, to general Satisfaction, by his *alchemical Processes* and *elaborate Operations*.

N. B. Of him may be had printed *Sermons*, fitted for *orthodox Brethren*, upon all Subjects and Occasions, for any *Week* of the Year, Price 1s. — *Atheists* will not be supplied. — Enquire for the Rev. Mr. *Piper*, at his *Elaboratory* and *Observatory*, in *Upper Moorfields*; also at *Sisson's Coal-hole* in the *Strand*.

••• The printed and written *LIBEL* extraordinary, signed Non A. R. and the extraordinary *LIBEL*, signed *Bloody Butcher*, were both received.

ADVERTISEMENT.

••• Our Correspondents, in general, are desired to send all their Letters and Productions before the End of May, (*franked or Post-paid*); the sooner they send the more they can be obliged; directed to the *Palladium-Author*, at Mr. *Cole's*, *Mathematical Instrument-Maker*, in *Fleet-street*, *London*.

A NEW

A NEW GUIDE to the YEAR 1772.

P A R T I.

To find the Day of the Month from the Day of the Week, and Day of the Week from the Month-Day.

Against each Month of the Year, to the Right-hand, stand the Seven Week-Days, above which stand all the Month-Days in that Month, answering to each Week-Day.			MONTH DAYS and WEEK DAYS.						
			1	2	3	4	5	6	7
			8	9	10	11	12	13	14
			15	16	17	18	19	20	21
			22	23	24	25	26	27	28
			29	30	31				
MONTHS of the YEAR.									
January.	April.	July.	We	Th	Fr	Sa	Su	Mo	Tu
February.	August.		Sa	Su	Mo	Tu	We	Th	Fr
March.	November.		Su	Mo	Tu	We	Th	Fr	Sa
	May.		Fr	Sa	Su	Mo	Tu	We	Th
	June.		Mo	Tu	We	Th	Fr	Sa	Su
September.	December.		Tu	We	Th	Fr	Sa	Su	Mo
	October.		Th	Fr	Sa	Su	Mo	Tu	We

For Construction of the above Table, see P. 2, Palladium, 1763.

EXAMPLE I. To find the Day of the Month answering to the third Thursday in July, 1772.

To the Right-hand of July you find Th, or Thursday; directly above which, in the Columns among the Month-Days, stand 2, 9, 16, 23, and 30, answering to all the Thursdays in July: Therefore the third Thursday is the 16th Day, required. So for other like Cases.

EXAMPLE II. To find the Day of the Week on which Christmas-day, or the 25th of December, happens, 1772.

Under 25, the Month-Day, against December, at the Angle where the upper and Side Columns meet, stands Fr, or Friday, required. So for other like Cases.

NOTES for 1772.		Moveable FEASTS.	SUN rises.			
Dom. Let. N.S. ED	O. S. AG		Mths.	1st	11th	21st
Golden Number 6		Feb. 16. Septuages.		h m	h m	h m
Epact (or D's Age at Year's Beginning) 25		Mar. 4. Ash-Wed.		8 57	58 7	45
Sun's Cycle 17		8. 1 Sund. Lent	Jan.	7 22	6 6	30
Roman Indiction 5		Apr. 19. East. Sund.	Feb.	6 32	6 12	52
Æra Jul. Per. 6485		May 24. Rog. Sund.	Mar.	5 31	5 11	4 53
Olympiads 2547		28. Ascension	April	4 35	4 20	4 4
Found. Rome 2524		June 7. Whitsunday	May	3 51	3 45	4 43
Nabonassar 2518		14. Trin. Sund.	June	3 46	3 54	4 4
Hegira 1150		Nov. 29. Advent Sun.	July	5 15	5 32	5 54
Gregorian Æra 190		Ember-Days.	Aug.	4 13	6 33	6 33
		Mar. 11, 13, 14.	Sept.	6 13	6 33	6 33
Jul. Per. 1 Yr. more than by French Acct,		Jun. 10, 12, 13.	Oct.	7 12	7 30	7 45
Nabonassar & Found. Rome 1 Year less.		Sep. 16, 18, 19.	Nov.	7 58	8 68	8
		Dec. 16, 18, 19.	Dec.			

ANNUAL MISCELLANY, 1772.

Astronomical MOONS for Greenwich-Observatory, 1772.

New Moon.			First Quarter.			Full Moon.			Last Quarter.		
Mths.	d	h m	d	h m		d	h m		d	h m	
Jan.	4	11 41 A	13	2 35 M		20	10 37 M		27	2 11 M	
Feb.	3	4 58 A	11	10 17 A		18	9 19 A		25	1 21 A	
Mar.	4	11 17 M	12	1 54 A		19	7 2 M		26	2 21 M	
Apr.	3	5 22 M	11	1 17 M		17	4 4 A		24	5 14 A	
May	2	9 44 A	10	9 2 M		17	0 51 M		24	9 30 M	
June	1	11 24 M	8	2 22 A		15	9 51 M		23	2 40 M	
	30	10 19 A									
July	30	7 22 M	7	6 51 A		14	8 10 A		22	8 4 A	
Aug.	28	3 46 A	5	11 54 A		13	8 39 M		21	0 48 A	
Sep.	26	12 22 A	4	6 59 M		11	11 55 A		20	4 1 A	
Oct.	26	9 48 M	3	5 9 A		11	5 26 A		19	5 17 A	
Nov.	24	8 16 A	2	7 6 M		10	11 54 M		18	4 31 M	
Dec.	24	7 58 M	2	1 0 M		10	5 35 M		17	1 55 A	
			31	9 56 A							

N. B. M stands for Morning and A for Afternoon.

Add to the Month-day for the Moon's Age.		New D.	Sun and Moon's Place at New Moon.		Sun enters Signs.	Sub. and add from and to D's Southing for her Rising & Setting.		To find the Tides at London.	
No.	d		s	o		Moon's Place.	Arc \pm	Rule. Add 2 ^h 30 ^m to Time of D's Southing (fr. the Table of her Southing) for Time of High Water required.	
Jan.	25	4	9	14	♊ 20	3 0	8 30	Ex. May 20, 1772, D's souths by Tab. follow 20 ^d 2 ^h 51 ^m Add 2 30	
Feb.	27	3	10	14	♋ 18	4 2	8 15	H.W. 5 m 21	
Mar.	26	4	11	15	♌ 20	5 1	7 15	Add 5 10	
Apr.	27	3	0	14	♍ 19	6 0	6 15	L.W. 10 m 31	
May	27	2	1	13	♎ 20	7 11	5 15	at Lond. Bridge.	
June	29	1 30	2	11	♏ 20	8 10	4 15	N.B. Time of H. & L.W. at Lond. Serves for Boats and Vessels bound down & up the R. or fr. ab. & below Bridge, to Lond. respectly.	
July	29	0 30	4	8	♐ 22	9 0	4 0	Gen. Rule. Add the T. of H.W. at N. and Full D for any Place, accor ^d to a Tide-Tab. to the Time of D's South- ing, that Day, for H.W. at that Place.	
Aug.	1	28	5	6	♑ 22	9 20	4 15		
Sep.	3	26	6	4	♒ 22	10 29	5 15		
Oct.	4	26	7	4	♓ 22	0 0	6 15		
Nov.	5	24	8	3	♐ 21	0 29	7 15		
Dec.	6	24	9	3	♑ 21	1 28	8 15		
<p>Here the Day of N. D and No. added for the following Month make up the Days in the present Month.</p> <p>Ex. Apr. N. D 3, and May 27, added = 30 Ds. in Apr. the present Month. N. D Au. 28 & Sep. 3 added = 31 Ds. in Au. &c.</p> <p>To find Moon's Age. Ex. 1. Oct. 20 Add No. 4 Moon's Age 24 (Days.</p> <p>Ex. II. Apr. 15 Add No. 27 42 Abate 30 Moon's Age 12 N.B. When Age is above 29 or 30 Ds. sub. 29 or 30, as 1st & 2d Col's make 29 or 30.</p> <p>To find Sun's Place. Sub. or add Deg. for Ds. bef. or aft. Centers a Sn. for his Place. Required Sun's Place for Oct. 10, 1772. 260c. ☉'s Pl. 7^s 4^u 16Ds. & Degs. — 16 100c. ☉'s Pl. 6 18</p> <p>Reg. D Pl. May 20. D's Age 18^d by 13^h = 7^s 27^u D's Pl. at } N. D add } 1 13 D Pl. May } 20, Noon } 9 10 A near Comput. only</p> <p>To find D's Rising & Setting, May 20, 1772 D m. Pl. fr. ab. 9^s 10^u Arc * corref \pm 4^h 7 D's So. 21st D. 3m 43 D rises 20^d 11 23^h 56 Sets 21^d 7m 50 N.B. Take the Arc \pm nearest or proper to D's Place above.</p>									

N. B. The Festival marked * is preceded by a Vigil or Fast. If any of the Feast-days fall on a Monday, the Vigil or Fast-day must be kept on the Saturday before, and not on the Sunday, which is the greatest of Festivals.

The Days having this Mark, †, against them are Holidays observed at the Exchequer, Stamp-Office, Excise-Office, Custom-House, Bank, East-India, and South-sea House.

At the Custom-House there is no Holiday on Valentine, St. David, Shrove-Tuesday, Easter-Wednesday, St. Swithin, Lammas-day, Fire of London, or Holy-Rood.

††† The Offices are mentioned 'All but such and such,' after †, where no Holidays are kept, when they are kept in all the other Offices.

JANUARY, XXXI DAYS.

- 1 Circumcision. †
- 4 Sir Isaac Newton b. 1643, N.S.
- 5 1 Sunday after Circumcision.
- 6 Epiphany, or Twelfth day. †
All but South-sea House.
- 8 Lucian.
- 12 1 Sunday after Epiphany.
- 13 Hilary Cam. Term begins.
- 14 Oxford Term begins.
- 15 Exchequer opens.
- 17 Old Twelfth-day.
- 18 Prisca. Q. Cha. Birth-day kept. †
Ruffians at Portsmouth, on Friday, 1771. See the Chronicle.
- 19 2 Sunday after Epiph.
- 20 Fabian. 1 Return.
- 21 Agnes.
- 22 Vincent.
- 23 Hilary Term begins.
- 25 Conversion of St. Paul. †
- 26 3 Sunday after Epiphany.
- 27 2 Return.
- 30 K. Charles I. beheaded 1648-9,
O. S. 12 Minutes past One. †

FEBRUARY, XXIX DAYS.

- 2 4 Sunday after Epiphany.
Purific. B. V. or Candlemas. †
- 3 Bishop Blaize. 3 Return.
- 5 Agatha.
- 9 5 Sunday after Epiphany.
- 10 4 Return.
Dies scholastica at Oxford.
- 12 Hilary Term ends.
- 13 Old Candlemas-day.
- 14 Valentine. † All but Stamp,
Custom, and South-sea House.
- 16 Septuagesima Sunday.
- 23 Sexagesima Sunday.
- 24 St. Matthias.*†
- 28 Hare-hunting goes out.

MARCH, XXXI DAYS.

- 1 Quinquagesima, or Shrove-Sund.
St. David. Anniversary-Meeting of the Welch Society, who wear a Leek on this Day in Memory of a famous Victory gained over the Saxons. † All but the Stamp and Custom-H.
 - 2 Chad. B. Shrove-Monday.
 - 3 Shrove-Tuesday. †
All but the Custom-House.
 - 4 Ash-Wed. 1st Day in Lent. †
 - 5 Cambridge Commencement for
B. A. Day after Ash-Wednes.
Princess Mary of Hesse b. 1722.
 - 7 Perpet. Mauric.
 - 8 1 Sunday in Lent.
 - 11, 13, 14, Ember-days.
 - 12 Gregory Mart.
 - 15 2 Sunday in Lent.
 - 17 St. Patrick, Bishop of Ireland.
 - 18 Edward, K. of the W. Saxons.
 - 19 Joseph.
 - 20 Outhbert. Equal Day and Night.
 - 21 St. Benedict.
 - 22 3 Sunday in Lent.
 - 25 Annunciation of the V. Mary.*
LADY-DAY, 1st Quarter-D. †
 - 29 4 Sunday in Lent, or Midlent-Su.
 - 31 Ruffians at Portsmouth, on Friday, 1769. See the Chronicle.
Sir I. Newton died, 1727, N.S.
- ### APRIL, XXX DAYS.
- 1 Fool's-Cap Day; Hatton-Harry,
Exeter Jack, Leonard Libel,
Mr. O Fagon, &c.
 - 3 Richard, B. of Chichester.
 - 4 St. Ambrose.
Cambridge latter Act, Thursday
after the 4th Sunday in Lent.
 - 5 5 Sunday in Lent, Old Lady-day.
 - 10 Cambridge Term ends.

ANNUAL MISCELLANY, 1772.

- 11 Oxford Term ends.
- 12 6th Sunday in Lent, Palm-Sund.
- 15 Sun and Clocks together.
- 16 Maundy-Thurday.
- 17 Good-Friday. †
- 19 EASTER-SUNDAY. Alphege.
- 20 Easter-Monday. †
- 21 Easter-Tuesday. †
- 22 Easter-Wed. † All but Custom-h.
- 23 St. George. †
- 25 St. Mark †
- 26 1 Sund. after Easter. Low-Sund.
- 27 Victory of Culloden.
- 29 Oxford and Camb. Terms begin
Wednesday after Low-Sunday.
- MAY, XXXI DAYS.
- 1 St. Philip and St. James. †
- 3 2 Sunday after Easter.
Invention of the Cross.
- 4 1 Return.
- 6 St. John ante Port. Lat.
Easter Term begins.
- 10 3 Sunday after Easter.
- 11 2 Return.
- 12 Old May-day.
- 17 4 Sunday after Easter.
- 18 3 Return. Westminster Election
Day after 4th Sun. after Easter.
- 19 Dunstan. Q. Charlotte b. 1744.
- 24 5 Sun. aft. Easter, Rogation-Sun.
- 25, 26, 27, Rogation-days. 4 Ret.
- 26 Augustine, 1st Abp. of Cant.
No Night, but all Twilight.
- 27 Venerable Bede.
- 28 Ascension-day, or Holy Thurs. †
All but the South-sea House.
- 29 King Charles II.'s Nativity and
Rest. after 12 Yrs Exile. 5 Ret.
- 31 Sun. aft. Ascension, or 6 S. af. East.
- JUNE, XXX DAYS.
- 1 Nicomedes. Easter Term ends.
- 4 King George III. born 1738. †
Oxford Term ends.
- 5 Boniface.
- 7 WHIT-SUNDAY.
- 8 Whit-Monday. †
- 9 Whit-Tuesday. †
- 10 Princess Amelia b. 1711. † All
but Excheq. and Custom-house.
- Whit-Wednesday. † All but
the Custom-house.
- 10, 12, 13, Ember-days.
- 11 St. Barnabas. †
- 14 Trinity-Sunday.
- 15 1 Return.

- 16 Sun and Clocks together.
- 17 St. Alban. Oxf. Term begins.
- 19 Trinity Term begins.
- 20 Transl. of Edw. K. W. Saxons.
- 21 1 Sunday after Trinity.
- 22 2 Return. Longest Day.
Trinity College Election.
- 24 ST. JOHN BAPTIST. † 2d
Quarter-day. Ox. & Cam. T. beg.
- 25 St. John's College Election.
- 28 2 Sunday after Trinity.
- 29 St. Peter and Paul. † 3 Return.
- 30 Buck-hunting comes in & con-
tinues till Holy-rood. Exeter &
Wadhams Col. Elect. at Oxf.
- JULY, XXXI DAYS.
- 2 Visitation of the B. V. Mary.
- 3 Dies Comitiorum.
- 4 Translat. of St. Martin, Bishop.
- 5 3 Sun. after Trin. Old Midsum. d.
- 6 4 Return.
- 7 Cambridge Commencement for
B. A. 1st Tuesday in July.
Tho. à Becket, Church Tyrant.
- 8 Trinity Term ends.
- 10 Cambridge Term ends.
- 12 4 Sunday after Trinity.
- 14 Oxford Act, 7 Days from Cam-
bridge Commencement.
- 15 St. Swithin. † All but Stamp,
Custom, and South-sea House.
- 19 5 Sunday after Trinity.
- 20 Margaret, Virgin and Martyr.
- 22 Mary Magdalen.
Q. of Denmark born 1751. †
- 24 Magdalen College Election:
- 25 St. James * †
- 26 6 S. af. Trin. Ann. Mother BVM.
- 27 Portsmouth-Dock fired at 4 in
Morn. 1770, since which Union-
street was suddenly deserted by an
Erostratus seeking his Reward.
- 30 Dog-days begin. Canicula rises
with the Sun.
- AUGUST, XXXI DAYS.
- 1 Lammas Day. †
- 2 7 Sunday after Trinity.
- 4 Crown-Point in America taken
by General Amherst, 1759.
- 6 Transfiguration.
- 7 Name of Jesus.
- 9 8 Sunday after Trinity.
- 10 St. Laurence.
- 11 Princess of Brunswic b. 1737. †
All but Cust. and S. S. H.

- 12 Old Lammass-day.
Prince of Wales born 1762. †
15 Assumption.
16 9th of T. Bp of Osnaburgh b. 1763
21 Athanasius. Pr. Wm b. 1765.
23 10 Sunday after Trinity.
24 St. Bartholomew. †
28 St. Augustine.
29 Beheading of St. John Baptist.
30 11 Sunday after Trinity.
Sun and Clocks together.

SEPTEMBER, XXX DAYS.

- 1 St. Giles.
2 London burnt, 1666, O. S. †
6 12 Sunday after Trinity.
8 Nativity of the B. V. Mary.
9 Dog-days end. Canis Major rises at 3 in the Morning.
13 13 Sunday after Trinity.
14 Holy-Cross Day. † All but Sta. Custom and South-sea House.
16, 18, 19, Ember-days.
17 Lambert B.
18 City of Quebec surrendered to General Townshend, 1759. K. George I. and II. landed. † All but at the Custom-house.
20 14 Sunday after Trinity.
21 St. Matthew. †
22 K. Geo. III. and Q. Charl. Cor. 1761. † Equal Day and Night.
26 St. Cyprian.
27 15 Sunday after Trinity.
28 Sheriffs of London sworn.
ST. MICHAEL, third Quarter-day. † Hare-hunting comes in and lasts till the End of Feb. Princess Charlotte b. 1766.
30 St. Jerome.

OCTOBER, XXXI DAYS.

- 1 Remigius, Bishop of Rhemes.
4 16 Sunday after Trinity.
6 St. Faith.
9 St. Dennis.
10 Old Michaelmas-day. Oxford and Cambridge Terms begin.
11 17 Sunday after Trinity.
13 Transl. of K. Edw. Confessor.
17 Etheldred V.
18 18 Sun. after Trin. St. Luke. †
19 St. Frideswide, a Festiv. at Court.
25 19th of Trin. Geo. III. Access. †
26 St. Crispin. Geo. III. proclaimed, 1760. † All but the Stamp, Excise, Custom and S. S. H.

- 28 St. Simon and Jude. †

NOVEMBER, XXX DAYS.

- 1 20 Sun. after Trin. All Saints. †
2 All Souls. † All but the Stamp, Custom and South-sea House.
3 1 Return. All-Souls Col. Elect.
4 K. William b. 1605, O. S.
5 Gun-Powder Treason. †
6 Leonard. Mich. Term begins.
7 Duke of Cumberland b. 1745.
8 21 Sunday after Trinity.
9 Lord-Mayor's Day, London. † All but the Exchequer.
11 St. Martin.
12 2 Return.
13 Britius, Bishop.
15 22 Sund. after Trin. Machutus.
17 Hugh Bp Lincoln. Anniv. Q. Eliz. Procl. † All but Cust. & S. S. H.
18 3 Return.
20 Edmund, King and Martyr.
22 23 Sunday after Trinity.
Cecilia. Old Martinmas-day.
23 St. Clement.
25 St. Catherine. 4 Return.
D. of Gloucester born 1743. † Balliol College Election Thursday before St. Andrew.
28 Michaelmas Term ends.
29 Advent Sunday.
30 St. Andrew. † Princess Dowager of Wales born 1719. †

DECEMBER, XXXI DAYS.

- 4 Barbary.
6 2 Sunday in Advent.
8 Conception of the B. V. M.
13 3 Sunday in Advent. Lucy.
16 O Sapientia. Camb. Term ends.
16, 18, 19, Ember-days.
17 Oxford Term ends.
20 4 Sunday in Advent.
21 St. Thomas. †
22 Shortest Day.
23 Sun and Clocks together.
25 CHRISTMAS-DAY, 4th Quarter-Day. Fox-hunting comes in and lasts till Lady-day.
26 St. Stephen. †
27 1 Sunday after Christmas.
St. John the Evangelist. †
28 Holy Innocents.
31 Silvester, Bishop of Rome.

TABLE of the Moon's Southings, or Times when she passes the Meridian of Greenwich Observatory, for the Year 1772. For the Use of Seamen, in finding the Time of Tides, &c.

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
D.	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	8m54	10m10	9m45	10m44	10m56	02 3	0230	1254	3228	4217	5217	5255
2	9 47	10 38	10 29	11 27	11 43	0 55	1 24	2 48	4 24	5 13	6 36	6 37
3	10 41	11 44	11 13	02 9	0231	1 48	2 18	3 41	5 19	6 7	7 21	7 20
4	11 33	0239	11 56	0 54	1 20	2 43	3 11	4 35	6 16	6 59	8 5	8 2
5	0223	1 12	0238	1 40	2 10	3 36	4 3	5 30	7 11	7 48	8 47	8 45
6	1 11	1 54	1 20	2 28	3 2	4 29	4 54	6 22	8 3	8 25	9 30	9 29
7	1 55	2 35	2 3	3 16	3 54	5 20	5 47	7 18	8 53	9 20	10 12	10 14
8	2 41	3 18	2 48	4 9	4 48	6 11	6 39	8 13	9 41	10 2	10 55	11 1
9	3 22	4 2	3 34	5 1	5 40	7 2	7 32	9 7	10 28	10 46	11 40	11 49
10	4 5	4 47	4 22	5 55	6 31	7 55	8 29	9 59	11 12	11 28	Morn	Morn
11	4 44	5 33	5 12	6 48	7 25	8 48	9 24	10 49	11 56	Morn	0 26	0 40
12	5 28	6 24	6 5	7 42	8 18	9 44	10 18	11 37	Morn	0 12	1 15	1 31
13	6 13	7 16	6 59	8 36	9 10	10 41	11 12	Morn	0 39	0 56	2 4	2 22
14	6 58	8 11	7 54	9 30	10 6	11 37	Morn	0 23	1 22	1 41	2 53	3 13
15	7 48	9 8	8 51	10 25	11 3	Morn	0 4	1 7	2 5	2 28	3 44	4 3
16	8 39	10 5	9 47	11 22	12 0	0 33	0 54	1 51	2 50	3 16	4 35	4 53
17	9 35	11 4	10 43	Morn	Morn	1 27	1 41	2 33	3 35	4 6	5 25	5 43
18	10 31	12 0	11 39	0 19	0 58	2 18	2 26	3 16	4 23	4 56	6 16	6 34
19	11 30	Morn	Morn	1 17	1 55	3 7	3 10	4 0	5 13	5 48	7 7	7 26
20	Morn	0 56	0 36	2 15	2 51	3 53	3 52	4 45	6 3	6 40	7 58	8 19
21	0 27	1 51	1 33	3 13	3 43	4 36	4 35	5 32	6 55	7 32	8 51	9 16
22	1 23	2 46	2 30	4 8	4 33	5 19	5 18	6 19	7 49	8 26	9 46	10 12
23	2 18	3 41	3 27	5 1	5 20	6 1	6 2	7 11	8 43	9 17	10 43	11 11
24	3 12	4 36	4 24	5 50	6 4	6 43	6 48	8 4	9 38	10 13	11 42	02 9
25	4 4	5 31	5 18	6 37	6 46	7 27	7 36	8 59	10 33	11 9	0242	1 5
26	4 57	6 25	6 11	7 23	7 29	8 12	8 27	9 54	11 29	02 7	1 41	1 58
27	5 49	7 17	7 2	8 7	8 10	8 59	9 20	10 50	0225	1 6	2 38	2 48
28	6 42	8 9	7 49	8 49	8 53	9 47	10 14	11 46	1 23	2 7	3 32	3 35
29	7 35	8 57	8 35	9 31	9 37	10 41	11 23	0241	2 21	3 5	4 23	4 20
30	8 28		9 19	10 14	10 24	11 35	02 5	1 37	3 19	4 2	5 10	5 4
31	9 20		10 2		11 13		1 0	2 32		5 0		5 46

To find Time of H. Water, on any Day of the Month, at any given Place, for 1772.

Gen. Rule. To the Time of the Moon's Southing (fr. the above Tab.) for that Day, add the Time of H. W. at N. and F. Moon in the given Place (fr. Tide-Tab. p. 105, 106. Pal. 1765; or any other Tide-T.) and the Sum, abating 12, when above 12^h will be T. of H. W.

Example. To find the Time of High Water, at London, on May 1, 1772.

From the above Table, the Moon souths, at London, on that Day, 10^h 56^m Morn.

To which add the constant Time of High Water at New and Full, Lond. 2 30

Time of High Water, May 1, at London, 1 26 A. req.
Add for next Low Water, 5 30

Low Water at London, May 1, 6 56 A.

N. B. Time of H. W. serves for Boats & Vessels bound to Places below Bridge, fr. Lond. and Time of Low Water serves for Boats & Vessels bound to Places above Bridge, fr. Lond.

Seamen may determine the Time of H. & L. W. at all Places by the foregoing Gen. Rule, fr. the above Tab. and the constant Time of H. W. at N. & F. Moon, at each Place, fr. a Tide-Table. The above Table is also of Use for finding the Moon's near Time of Rising and Setting, from her mean Place, and Semi-duration Arc, for any Place.

TABLE of the Eclipses of the first SATELLITE of JUPITER, for Gr. Obs. 1772.
For finding the Difference of Longitude, by Sea or Land.

January.	February.	March.	April.	May.	June.
		Immerf.	Immerf.	Immerf.	Immerf.
<p>If this Mth being so near ☉, the Eclip of his Sat. can not be seen. The *is plac'd against the visible Eclipses of the first Sat. of 11 for Greenwich.</p> <p>N.B. When the Time at the Ship is later than that at Greenwich, the Longitude is East; if sooner, West of Greenwich.</p>	<p>Jupiter's Satellites are invisible this Month also, by being too near the Sun.</p>	<p>D. h m s</p> <p>2 12 13 20</p> <p>4 6 42 26</p> <p>6 1 11 15</p> <p>7 19 40 20</p> <p>9 14 9 10</p> <p>11 8 38 11</p> <p>13 3 7 5</p> <p>14 22 36 15</p> <p>16 16 5 18</p> <p>18 10 34 10</p> <p>20 5 3 15</p> <p>21 23 32 11</p> <p>23 18 1 12</p> <p>25 12 30 17</p> <p>27 6 59 5</p> <p>29 1 28 9</p> <p>30 19 57 15</p>	<p>D. h m s</p> <p>1 14 26 1</p> <p>3 18 55 2</p> <p>5 3 23 56</p> <p>6 21 52 55</p> <p>8 16 21 48</p> <p>10 10 50 45</p> <p>12 5 19 36</p> <p>13 23 48 21</p> <p>15 18 17 19</p> <p>17 12 46 10</p> <p>19 7 14 51</p> <p>21 1 43 40</p> <p>22 20 12 28</p> <p>24 14 41 11</p> <p>26 9 9 49</p> <p>28 3 38 30</p> <p>29 22 7 53</p>	<p>D. h m s</p> <p>1 16 35 45</p> <p>3 11 4 15</p> <p>5 5 32 49</p> <p>7 0 1 17</p> <p>8 18 29 42</p> <p>10 12 58 10</p> <p>12 7 26 35</p> <p>14 1 54 56</p> <p>15 20 23 19</p> <p>17 14 51 40</p> <p>19 9 19 55</p> <p>21 3 48 9</p> <p>22 22 16 27</p> <p>24 16 44 35</p> <p>26 11 12 50</p> <p>28 5 40 51</p> <p>30 0 8 51</p> <p>31 18 37 0</p>	<p>D. h m s</p> <p>2 13 5 15</p> <p>4 7 33 8</p> <p>6 2 1 15</p> <p>7 20 29 18</p> <p>9 14 57 18</p> <p>11 9 25 25</p> <p>13 3 53 29</p> <p>14 22 21 30</p> <p>16 16 49 35</p> <p>18 11 17 33</p> <p>20 5 45 33</p> <p>22 0 13 30</p> <p>23 18 41 30</p> <p>25 15 9 39</p> <p>27 7 37 40</p> <p>29 2 5 46</p> <p>30 20 33 47</p>
July.	August.	Septemb.	October.	Novemb.	Decemb.
Immerf.	Immerf.	Emerfion.	Emerfions	Emerfions	Emerfions
<p>D. h m s</p> <p>2 15 1 46</p> <p>4 19 29 55</p> <p>6 3 58 0</p> <p>7 22 26 10</p> <p>9 16 54 20</p> <p>11 11 22 37</p> <p>13 5 50 51</p> <p>15 0 19 8</p> <p>16 18 47 25</p> <p>18 13 15 51</p> <p>20 7 44 17</p> <p>22 2 12 43</p> <p>23 20 41 13</p> <p>25 15 9 39</p> <p>27 9 38 13</p> <p>29 4 6 45</p> <p>30 22 35 27</p> <p>31 21 32 17</p>	<p>1 17 4 7</p> <p>3 11 42 40</p> <p>5 6 1 21</p> <p>7 0 30 13</p> <p>8 18 59 0</p> <p>10 13 27 55</p> <p>12 7 56 45</p> <p>14 2 25 47</p> <p>15 20 54 39</p> <p>17 15 23 37</p> <p>19 12 8 14</p> <p>21 6 37 17</p> <p>23 1 6 19</p> <p>24 19 35 30</p> <p>26 14 4 45</p> <p>28 8 33 55</p> <p>30 3 3 10</p> <p>31 21 32 17</p>	<p>D. h m s</p> <p>2 16 1 34</p> <p>4 10 30 55</p> <p>6 5 0 9</p> <p>7 23 29 25</p> <p>9 17 58 50</p> <p>11 12 28 17</p> <p>13 6 57 35</p> <p>15 1 27 0</p> <p>16 19 56 21</p> <p>18 14 25 52</p> <p>20 8 55 10</p> <p>22 3 24 36</p> <p>24 21 54 7</p> <p>25 16 23 31</p> <p>27 10 52 59</p> <p>29 5 22 25</p> <p>31 2 8 54</p>	<p>D. h m s</p> <p>2 18 21 10</p> <p>4 12 50 40</p> <p>6 7 20 5</p> <p>8 1 49 19</p> <p>9 20 18 50</p> <p>11 14 48 10</p> <p>13 9 17 29</p> <p>15 3 46 47</p> <p>16 22 15 54</p> <p>18 16 45 9</p> <p>20 11 14 20</p> <p>22 5 43 30</p> <p>24 0 12 40</p> <p>25 18 41 46</p> <p>27 13 10 49</p> <p>29 7 39 55</p> <p>31 2 8 54</p>	<p>D. h m s</p> <p>1 20 37 57</p> <p>3 15 6 57</p> <p>5 9 35 49</p> <p>7 4 4 40</p> <p>8 22 33 31</p> <p>10 17 2 11</p> <p>12 11 30 57</p> <p>14 5 59 31</p> <p>16 0 28 15</p> <p>17 18 56 54</p> <p>19 13 25 30</p> <p>21 7 53 48</p> <p>23 2 22 28</p> <p>24 20 50 50</p> <p>26 15 19 17</p> <p>28 9 47 39</p> <p>30 4 15 59</p>	<p>D. h m s</p> <p>1 22 44 15</p> <p>3 17 12 31</p> <p>5 11 40 47</p> <p>7 6 8 52</p> <p>9 0 37 1</p> <p>11 19 5 25</p> <p>12 13 33 27</p> <p>14 8 1 40</p> <p>16 2 29 41</p> <p>17 20 57 51</p> <p>19 15 25 57</p> <p>21 9 53 51</p> <p>23 4 22 6</p> <p>24 22 50 7</p> <p>26 17 18 16</p> <p>28 11 46 20</p> <p>30 6 14 29</p>

To find the Difference of Longitude from Greenwich Observatory.

Rule. The Difference of Time between any Eclipse of Jupiter's first Satellite, at Greenwich, happening as above, and the Time the same Eclipse is observed to happen under a distant Meridian, being turned into Degrees, at Sea or Land, will be the Difference of Longitude between Greenwich and the Place of Observation.

Example. Eclipse of 1st Satellite of Jupiter at Greenwich, Apr. 1st 14^h 26^m 1^s

The same being observed at Sea, or a distant Port, sooner, 1 9 17 10

Hence, Dif. Long. to the West of Greenwich, is 77° 12' 45", req. Dif. 5 8 51

Three ECLIPSES of the SUN, and Two of the MOON, for 1772.

I. Of the SUN: Invisible in England. April 3^d. Morning. True Conjunction 5 h. 23 m. 31 s. and Latitude of the Moon $10^{\circ} 21' 41''$. On a small Part of the Sun's superior Limb it will be seen in Holland and Germany. The two Limbs of the Sun and Moon are seen to touch at Sun-rise, in 50° Latitude, and 28° Longitude, from Paris. It may be seen at Prague, Cracow, and Moscow. — This Eclipse is unnoticed by the present Astronomer Royal of Greenwich, who is Conductor-General of the Nautical Ephemeris, for finding the Longitude.

II. Of the MOON, visible, April 17, in the Evening.

Beginning $2^h 20^m 8^s$ A.

Immersion 3 17 29

Emerision 4 56 41

End — 5 53 52

Digits — $21^{\circ} 3'$ on the

Southern Part: Seen in

the North-East of Europe.

According to the
Nautical Ephemeris.

Beginning — — — — — $2^h 17^m \frac{1}{2}$

Beginning of total Darkness 3 14 $\frac{1}{2}$

Middle — — — — — 4 4 $\frac{1}{2}$

End of total Darkness — 4 54 $\frac{1}{2}$

End of the Eclipse — — 5 52

Digits eclips'd — — — — — $21^{\circ} 18'$

III. Of the SUN, invisible, September 26^d $12^h 23^m$, in $4^{\circ} 24'$ of Libra. Moon's Latitude $10^{\circ} 24' \frac{1}{2}$ South. Visible only in Places near the South Pole. This only according to the Nautical Ephemeris. To be examined.

IV. Of the MOON, partly visible, October 11, in the Evening.

Beginning $3^h 30^m 50^s$

Immersion 4 36 27

Moon rises 5 17 40

Opposition 5 27 10

Emerision 6 20 19

End — 7 25 46

Digits — $19^{\circ} 43'$ in the

North Part.

According to the
Nautical Ephemeris.

Beginning — — — — — $3^h 29^m$

Beginning of total Darkness — 4 35

Middle — — — — — 5 27

Moon rises at Greenwich — — 5 28

End of total Darkness — — 6 19

End of Eclipse — — — — — 7 25

Digits — — — — — $19^{\circ} 46'$

V. Of the SUN, visible, October 26, Morning, at $9^h 49^m 30^s$, Latitude of the Moon $10^{\circ} 15' 7''$ N. At $8^h 36^m$ the Limbs of the Sun and Moon are seen about $45''$ distant. The North Limb of the Sun and South Limb of the Moon touch, at Sun-rise, at 1st Meridian, and at $54^{\circ} \frac{1}{2}$ Lat. N. Seen at Dublin, Dover, to the North of Amiens, South of St. Quintin, and North of Venice.

According to the } Greatest Obscuration 8 31 } Digits $0^{\circ} 6' \frac{1}{2}$
Nautical Ephemeris. } End 8 39 }

A COMPARISON of some Lunations, according to the British Nautical Ephemeris, conducted by Mr. Maskelyne, and the French Connoissance des Temps, (reduced to the Meridian of Greenwich): conducted by Mr. de la Lande.

Jan. 27 ^d	$2^h 12^m$	M. Nautical Ephem.	} Last Quarter.	
	26	M. Con. des Temps.	} Dif. 14 m. — Naut.	
Feb. 11	10 17	A. Nautical Ephem.	} First Quarter.	
	2	A. Con. des Temps.	} Dif. 15 m. + Naut.	
Mar. 26	2 22	M. Nautical Ephem.	} Last Quarter.	
	36	M. Con. des Temps.	} Dif. 14 m. — Naut.	
Aug. 23	3 45	A. Nautical Ephem.	} New Moon.	
	4 3	A. Con. des Temps.	} Dif. 18 m. — Naut.	
Nov. 10	11 54	A. Nautical Ephem.	} Full Moon.	
	0 1	A. Con. des Temps.	} Dif. 11 h 53 m + Naut.	

Quere the
Cause of so
great a Differ-
ence.

N. B. The nearest Numbers to Truth may be discovered by a Computation from the lunar Tables and Equations in the improved R. Ast. or from the Durham Tab. but more readily by a general Comparison with other annual Computations.

CHRONOLOGICAL TABLES and RULES for finding the Dominical Letter for ever, either according to Old or New Style; the Day of the Week to any Day of the Month; the Time of Easter, and moveable Feasts, for any Year past or to come; the Golden Numbers and Epact according to both Styles; Time of New, Full, and Quarter Moons; Time of Tides, or high and low Water, &c.

A perpetual

A perpetual DOMINICAL-LETTER TABLE, for shewing the Dominical Letter, for any Year, past or to come, for ever, according to Old Style. Demonstrating to Mr. Maskelyne, present Astronomer Royal, and all the World, that Mr. Mayer's astronomical Tables, published by him, for the Commissioners of Longitude, are not true in their Chronology, of 100, 200, 300, &c. Years, before Christ, being represented for Leap or Bissextile Years, and which should be 1, 101, 201, 301, &c.

Dominical Letters before Christ.								Dominical Letters since Christ.							
CENTURIES before Christ.								CENTURIES since Christ.							
2700	3400	4100	2700	3400	4100	2700	3400	1400	1500	1600	1700	1800	1900	2000	2100
600	1300	2000	600	1300	2000	600	1300	700	800	900	1000	1100	1200	1300	1400
2600	3300	4000	2600	3300	4000	2600	3300	100	200	300	400	500	600	700	800
500	1200	1900	500	1200	1900	500	1200	200	300	400	500	600	700	800	900
2500	3200	3900	2500	3200	3900	2500	3200	300	400	500	600	700	800	900	1000
400	1100	1800	400	1100	1800	400	1100	400	500	600	700	800	900	1000	1100
2400	3100	3800	2400	3100	3800	2400	3100	500	600	700	800	900	1000	1100	1200
300	1000	1700	300	1000	1700	300	1000	600	700	800	900	1000	1100	1200	1300
2300	3000	3700	2300	3000	3700	2300	3000	700	800	900	1000	1100	1200	1300	1400
200	900	1600	200	900	1600	200	900	800	900	1000	1100	1200	1300	1400	1500
2200	2900	3600	2200	2900	3600	2200	2900	900	1000	1100	1200	1300	1400	1500	1600
100	800	1500	100	800	1500	100	800	1000	1100	1200	1300	1400	1500	1600	1700
2100	2800	3500	2100	2800	3500	2100	2800	1100	1200	1300	1400	1500	1600	1700	1800
0	700	1400	0	700	1400	0	700	1200	1300	1400	1500	1600	1700	1800	1900
C	D	E	F	G	A	B	C	DC	ED	FE	GF	AG	BA	CB	CD
ED	FE	GF	AG	BA	CB	DC	ED	B	C	D	E	F	G	A	B
F	G	A	B	C	D	E	F	A	B	C	D	E	F	G	A
G	A	B	C	D	E	F	G	G	A	B	C	D	E	F	G
A	B	C	D	E	F	G	A	FE	GF	AG	BA	CB	DC	ED	FE
CB	DC	ED	FE	GF	AG	BA	CB	D	E	F	G	A	B	C	D
D	E	F	G	A	B	C	D	C	D	E	F	G	A	B	C
E	F	G	A	B	C	D	E	B	C	D	E	F	G	A	B
F	G	A	B	C	D	E	F	AG	BA	CB	DC	ED	FE	GF	AG
AG	BA	CB	DC	ED	FE	GF	AG	9	37	65	93	F	G	A	B
B	C	D	E	F	G	A	B	10	38	66	94	E	F	G	A
C	D	E	F	G	A	B	C	11	39	67	95	D	E	F	G
D	E	F	G	A	B	C	D	12	40	68	96	CB	DC	ED	FE
FE	GF	AG	BA	CB	DC	ED	FE	13	41	69	97	A	B	C	D
G	A	B	C	D	E	F	G	14	42	70	98	G	A	B	C
A	B	C	D	E	F	G	A	15	43	71	99	F	G	A	B
B	C	D	E	F	G	A	B	16	44	72		ED	FE	GF	AG
DC	ED	FE	GF	AG	BA	CB	DC	17	45	73		C	D	E	F
E	F	G	A	B	C	D	E	18	46	74		B	C	D	E
F	G	A	B	C	D	E	F	19	47	75		A	B	C	D
G	A	B	C	D	E	F	G	20	48	76		GF	AG	BA	CB
BA	CB	DC	ED	FE	GF	AG	BA	21	49	77		E	F	G	A
C	D	E	F	G	A	B	C	22	50	78		D	E	F	G
D	E	F	G	A	B	C	D	23	51	79		C	D	E	F
E	F	G	A	B	C	D	E	24	52	80		BA	CB	DC	ED
GF	AG	BA	CB	DC	ED	FE	GF	25	53	81		G	A	B	C
A	B	C	D	E	F	G	A	26	54	82		F	G	A	B
B	C	D	E	F	G	A	B	27	55	83		E	F	G	A
C	D	E	F	G	A	B	C	28	56	84		DC	ED	FE	GF

Example. To find the Dominical Letter for the 33d Year since Christ, the Year of his Crucifixion, Old Style.

Under 0 Centuries, to the Right, and 33 odd Years, to the Left, stands D, requiring Whence, by the Week-day Table in the next Page, April 3, the Day of Christ's Crucifixion was on a Friday, the 5th being on a Sunday. — N. B. The Dominical Letter, for any Year since Christ, will be the same as the Dominical Letter, since Christ, for the Completion of those Years, less 1, to any Number of 7 Hundred Years, and the contrary.

A perpetual

A perpetual DOMINICAL-LETTER TABLE, for
 finding the Dominical Letter, for any Year, past or to
 come, for ever, according to New Style.

Dom. Letters bef. Chr.				Dom. Letters since Chr.			
Centuries bef. Chrif.				Centuries since Chrif.			
0-4. E. 12. 16. 20. 24. 28. 32. 36.	5. 9. 13. 17. 21. 25. 29. 33.	6. 10. 14. 18. 22. 26. 30. 34.	7. 11. 15. 19. 23. 27. 31. 35.	1. 5. 9. 13. 17. 21. 25. 29. 33.	2. 6. 10. 14. 18. 22. 26. 30. 34.	3. 7. 11. 15. 19. 23. 27. 31. 34.	4. 8. 12. 16. 20. 24. 28. 32. 36.
Hundred.				Hundred.			
YEARS above Centuries, before and since CHRIST. New Style.							
G	B	D	F	C	E	G	BA
BA	C	E	G	B	D	F	G
C	D	F	A	A	C	E	F
D	E	G	B	G	B	D	E
E	F	A	C	FE	AG	CB	DC
GF	AG	CB	ED	D	F	A	B
A	B	D	F	C	E	G	A
B	C	E	G	B	D	F	G
C	D	F	A	AG	CB	ED	FE
ED	FE	AG	CB	F	A	C	D
G	G	B	D	E	G	B	C
A	A	C	E	D	F	A	B
B	B	D	F	CB	ED	GF	AG
CB	DC	FE	AG	A	C	E	F
D	E	Q	B	G	B	D	E
E	F	A	C	F	A	C	D
F	G	B	D	ED	GF	BA	CB
AG	BA	DC	FE	C	E	G	A
B	C	E	G	B	D	F	G
C	D	F	A	A	C	E	F
D	E	G	B	GF	BA	DC	ED
FE	GF	BA	DC	E	G	B	C
G	A	C	E	D	F	A	B
A	B	D	F	C	E	G	A
B	C	E	G	BA	DC	FE	GF
DC	ED	GF	BA	G	B	D	E
E	F	A	C	F	A	C	D
F	G	B	D	E	G	B	C
G	A	C	E	DC	FE	AG	BA

Ex. To find the Dom. Letters answering to the 365th Year
 of Ch. N.S. — Under 3 Centuries, or 300, to the Left, and
 against 65 odd Years to the Right, stand FE, required.

N. B. By Construction, the Dom. Let. for any No. of Yrs
 bef. Ch. will be the same as the Dom. Let. since Ch. for
 the Complement of those Years, less 1, to any No. of 400
 Years, and the contrary. — Ex. Dom. Let. B, bef. Chr.
 1934 — 1 = 1933 — 3600 (9 Times 400) = 1667, Com-
 plement, since Christ, Dominical Letter B.

WEEK and MONTH DAY
 TABLE; showing, by the
 Dominical Letter, of either
 Style, the Day of the Week to
 any Day of the Month, and
 the contrary, for ever.

Mnth:	Sunday or Dom. Letters.						
	A	B	C	D	E	F	G
Jan. 31	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
Oct. 31	22	23	24	25	26	27	28
	29	30	31	1	2	3	4
Feb. 28	5	6	7	8	9	10	11
Mar. 31	12	13	14	15	16	17	18
Nov. 30	19	20	21	22	23	24	25
	26	27	28	29	30	31	1
Apr. 30	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
July 31	23	24	25	26	27	28	29
	30	31	1	2	3	4	5
	6	7	8	9	10	11	12
Aug. 31	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	1	2
Sep. 30	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
Dec. 31	24	25	26	27	28	29	30
	31	1	2	3	4	5	6
	7	8	9	10	11	12	13
May 31	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	1	2	3
	4	5	6	7	8	9	10
June 30	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31

Example. To find the Week-
 Day to May 28, 585 Years be-
 fore Chrif, Old Style.

By the 1st Table, the Domi-
 nical Letters are FE, being
 Bissextile. Under E, against
 May, stand 4, 11, 18, 25, all
 the Sundays; consequently, the
 28th of May, 585, before
 Christ, was on a Wednesday;
 when the Battle was fought,
 and Peace ensued, between the
 Medes and Lydians.

Thus both Old and New Styles may be *correctly* carried backward or forward, as far as any one pleases, the same as if they had really existed.

To find the Difference of Days, more, between New and Old Style, for any Date before Christ.

DATES BEFORE CHRIST.

RULE I. From the *Hundreds*, less 1, take their *Fourth*; and add 2; These Days add to New Style, the Old one will shew.

Years.

Example. Hundreds 23150 before Christ.

Subtract 1

22 remain.

Subtract the Fourth, 5 neglecting the Remainder.

17 remain.

Add 2

Difference of Days 19 add to New Style for Old, at that Time.
So for all other Dates before Christ.

To find the Golden Number (or Prime), Sun's Cycle, and Roman Indiction, for any Year before Christ.

RULE II. Add to the Date, 17, 18, 11;

Divide by 19, 4 Sevens, 8, and 7;

Remainders take from these — then all are given.

Examples. Bef. Chr. 397

17

397
18

397
11

19)414(2

Take 15 Rem,
From 19

28)415(14

Take 23 Rem.
From 28

15)408(27

Take 3 Remainder
From 15, or 8 and 7,

Golden Number 4 Sun's Cycle 5 Indiction 12 Remainders.

N. B. When 0 remains after Subtraction, the Golden Number, Sun's Cycle, and Indiction, are, respectively, 19, 28, and 15.

When 17, 18, or 11, is added to the Date, if the Sum be less than 19, 28, or 15, subtract from those Numbers, respectively, and the Remainder will be the Golden Number, Sun's Cycle, or Indiction, respectively.

To find the Difference of Days, less, between New and Old Style, for any Date since Christ.

DATES SINCE CHRIST.

RULE III. From the *Hundreds*, their *Fourth*, and more 2, you must take; These Days take from New Style, the Old one will make.

Years.

Example. Hundreds 17172 since Christ.

2 more a Fourth, 6 subtract.

Difference of Days 11 remain; subtract from the New Style for the Old.

So for all other Dates since Christ.

To find the Golden Number, (or Prime), Sun's Cycle, and Roman Indiction, for any Year since Christ.

RULE IV. When 1, 9, 3, to the Date shall added be,
Divide by 19, 4 Sevens, 12 and 3,
You'll Prime, Sun's Cycle, and Indiction, see.*
* In the Remainders.

<i>Examples, Since Cbr. 1772</i>	<i>1772</i>	<i>1772</i>
<i>1 add.</i>	<i>9 add.</i>	<i>3 add.</i>
<hr/>	<hr/>	<hr/>
19)1773(93	28)1781(68	15)1775(118
Golden Number 6	Sun's Cycle 17	Indiction 5
Remainders for 1772 since Christ.		

N. B. When 0 remains after Division, the Golden Number, Sun's Cycle, and Roman Indiction, are, respectively, 19, 28, and 15.

When 1, 9, or 3, is added to the Date, if the Sum be less than 19, 28, or 15, it will be the Golden Number, Sun's Cycle, or Indiction, respectively.

To find the Epact for any Year since Christ, according to Old Style; being the Moon's Age at the Year's Beginning.

RULE V. Divide the Golden Number by 3, multiply the Remainder by 10, and divide that Product by 30 (if above 30), and the last Remainder will be the Epact, Old Style.

Example. 1772 since Christ.
Golden Number.

3)6(2	To 6 Golden Number
0 Remainder into 10	0 add
<hr/>	
Epact 6	

Or, Multiply the Golden Number by 11, divide the Product by 30, and the Remainder will be the Epact, Old Style.

Golden Number 6
by 11

<hr/>
30)66(2
Epact 6 Remainder.

To find the Moon's Age for any Day of the Month, in any Year, according to Old or New Style.

RULE VI. To the Day of the Month add the Epact (for Old or New Style), and the Number of the Month from March, counting March 1, when the Year formerly began, April 2, May 3, June 4, &c. to December 10; and January 0, February 1, (because 11 Days less for the former Year's Epact, used for January and February, subtract from 11, 12, reckoned on for those Months), the Sum of these three Numbers, rejecting 30 (when above), will be the Moon's Age.

Example 1. April 1, 1772.
Epact, New Style, 25
Number of Month 2

Example 2. February 16
Epact 25
Number of Month 2

28 Moon's Age.
April 3 New Moon.

43
Subtract 30

Subtract from Month-day 13 D's Age.

February 3 New Moon's
Rule

Rule for New Moon. When the *Moon's Age* is more than the *Day of the Month*, subtract it from 30, and add the Remainder to the *Day of the Month*, for *New Moon*, as above.

Or subtract the Sum of the *Month-day* and *Epaet* from 30 (or 60) for the *Day of New Moon*.

When the *Moon's Age* is less than the *Month-day*, subtract it therefrom, for the *Day of New Moon*, as above.

N. B. The above Rule gives the *Moon's Age*, or *New Moon*, but within a *Day*; because of the *Moon's irregular Motion*, and *Month's unequal Number of Days*, not agreeing with what are here reckoned equal; and the *Months*, from *March*, 31 and 30, alternately, breaking the Succession, at *August* 31 (instead of 30), *November* 30 (instead of 31), by *Augustus Caesar's* altering what *Julius Caesar* had wisely established; there is the following Rule for the following Numbers to be added, for the several Months, to the *Month-day* and *Epaet*, for the *Moon's Age*; as the *Moon's Age* is 29 and 30 Days, one Month with another, from *March*.

January 0, *February* 2, *March* 1, *April* 2, *May* 3,

June 4, *July* 5, *August* 6, *September* 8, agree,

October 8, *November* 10, *December* 10 — to *Epaet* add —

With *Day* — 'bate 30 — *Age*, or *Change*, is had.

But, as the above is but a near Rule, sometimes one Way comes nearest the Truth, and sometimes the other.

☞ This RULE is correctly supplied, by adding so many Days, in each Month, to the *Month-day*, (subtracting 30 when required), in P. 7 of this Year's Palladium, for her true Age, without farther Trouble; and so for every Year the Palladium is published.

To find the *Epaet* for any Year since Christ, according to New Style.

RULE VII. From the *Epaet* for the Year, O. S. (found as before), subtract 11, first adding 30 (if required), and the Remainder will be the *Epaet*, N. S. Or, which is the same,

Subtract 1 from the *Golden Number*, multiply the Remainder by 11, and divide the Product by 30; the Remainder will be the *Epaet* for New Style, from 17 to 1900. After the last Period, the *Epaets* alter, according to Tab. Col. 5 P. 168 of the Royal Astronomer.

Example. 1772. *Golden Number* 6

— 1

Remainder 5

By 11

30)55(25 *Epaet*, N. S.

So that in the Periods 1900, 2000, 2100, 2200, 2300, 2400, &c.

Subtract from the *Epaet*, O. S. 12 . . 12 . . 12 . . 13 . . 14 . . 13, &c. for the *Epaet*, New Style, according to the following

UNIVERSAL RULE, for finding the *Epaet*, New Style, for any Year since Christ, for ever. Which Rule will serve for Years before Christ, by carefully altering the Signs of Addition to Subtraction. Centuries before Christ are denoted by —, instead of +.

Divide Hundreds by 4, the Remainder thence had

Multiply by 17, and then 86 add;

Forty-three by that Quote must be added beside,

And then 25 the whole Sum must divide;

Subtract the last Quote from the Prime by 11,

Rejecting the Thirties, your *Epaet* is given.

Example.

Example. For 1900 since *Christ*.

Hundreds.

4) 19 (. . 4 Quote.
Remainder 3 By 43
By 17

172

51

Add 86

172

25)309(12 last Quote.

Golden Number 1

By 11

11

Add 30

41

Subtract 12 last Quote.

Epaet, 1900, New Style, 29

N. B. At 900 before *Christ*, the *Epaet* for Old and New Style are the same. The Moon's Age, or *Epaet*, advances, (instead of retreats), or the Days Dif. add (instead of subtract) before that Time; that is, the last Quote adds to the *Epaet* of old for that of new Style. — The foregoing is an original, as well as universal, Rule, and carries the New Style into remote Antiquity, or Futurity, the same as if it had always really existed.

To find the near Time of the Moon's Southing, and thence the near Time of High-Tide at London, generally.

RULE VIII. The Moon's Age by 4, if by 5 you divide,
Will give you her Southing: Add 3 for the Tide.

Example. The Moon's Age 9 Days.

By 4

5)36(7^h 12^m, past Noon, Time of D's Southing.

Add 3

High Water 10 12 at London.

Or, If you multiply the Moon's Age by Eight-Tenths, it will give you her Southing. — *N. B.* This Rule is correctly supplied by a Table of the Moon's Southing for the Year, at Page 11.

9

.8

7.2 = 7^h 12^m, as before.

Add 3 0

Time of High Water 10 12 at London.

To find Easter Limit, or the Paschal Full Moon, arithmetically, for New Style.

RULE IX. To the *Epaet* add 6, and reject Ten Times Three,

What remains take from 50, your Limit you'll see;

If 50 or 49's left, when you've done,

And the Prime above 11 — Take, for each, left by 11.

Example. For 1772. *Epaet* 25

Add 6

Golden Number 6

31
Reject 30

1

50

49 Days from March 1 inclusive, Fall of the
March 31 — [Limit,

April 18 the Limit.

20 THE BRITISH PALLADIUM, OR

To find Easter-Day, or the Number of Days it falls from the 1st of March, inclusive, Old Style, arithmetically.

RULE X. Take the Letter and 4 from the *Limit Day's Fall*,
The Remain from next Sevens — Add the *Limit*. — That's all,
From March 1.

<i>Example.</i> For 1772. <i>Limit Days</i> 49	<i>Dominical Letter D</i> . . 4
Subtract 8 —	Add 4
Rem. 41 —	Letter and 4 = 8
Six Sevens 42	

Rem. 1
Add 18 April, Easter-Limit for Full Moon.

Sum 19 April, 1772, Easter, N. S. required.

TABLE of the Fall of EASTER till 1800.

Year.	Easter.	Year.	Easter.	Year.	Easter.	Year.	Easter.
1773	Apr. 11	1780	Mar. 26	1787	Apr. 8	1794	Apr. 20
74	3	81	Apr. 15	88	Mar. 23	95	5
75	16	82	Mar. 31	89	Apr. 12	96	Mar. 27
76	7	83	Apr. 20	90	4	97	Apr. 16
77	Mar. 3	84	11	91	24	98	8
78	Apr. 19	85	Mar. 27	92	8	99	Mar. 24
79	4	86	Apr. 16	93	Mar. 31	1800	Apr. 13

Easter can never fall sooner than March 22, nor later than April 25.
The Sundays, between *Asc. Wednesday* and *Easter*, are called *Sundays in Lent*;
and the Sundays, between *Easter* and *Whit-Sunday*, are called *Sundays after Easter*.

N. B. The Distance of *Easter-Sunday* from *March 21*, is called by some the *Number of Direction*, instead of the *Limit's Fall*, as it is called by others.

See the *chronological Tables* in our *Royal Astronomer*, whereby most of these Things are found at Sight.

In using the *Dominical Letter* and *Golden Number Tables* in *R. Afr.* for all Years before *Christ*, (P. 148 to 150), you must take out for 1 Year more, answering to what there stands: Consequently, you must take out for a Year less than the present, for the present Year. This is an Improvement we made in *Chronology* since those *Tables* were printed, and according to our *Correction of Mayer's astronomical Tables*, before mentioned. Our *Dominical Letter* and other *chronological Tables*, in this Year's *Palladium*, are perfectly correct, as well for Years before, as since, *Christ*.

N. B. The *Dominical-Letter Tables* shew the *Leap-Years*, and Years since, at Sight; the *Leap-Years* having 2 *Dominical Letters*, all other Years but 1.

PRINCIPAL HOLYDAYS, or MOVEABLE FEASTS.

SUNDAYS.	Weeks		SUNDAYS.	Weeks
Septuagesima	9		Low-Sunday	1
Sexagesima	8		Rogation	5
Quinquagesima, or			Ascension-Day, or	
Shrove-Sunday	7	Before	Holy-Thursd.	
Asc. Wednesday		Easter.	next after Rogation	
next after			Whit-Sunday	7
Quinquagesima	6		Trinity	8
Palm-Sunday	5			
Good-Friday 2 Days				
before Low-Sunday				

The

• • • The *Dominical-Letter Tables*, for Old and New Style, supply the Rules for finding the *Dominical Letters*, according to Old and New Style, in the *shortest and simplest Manner*; as the *Week-Day Table*, at the End of the *Dominical-Letter Table for New Style*, supplies the Rules, in the *shortest Manner*, for finding the *Week-day* to any *Month-day*, and the *contrary*, for ever, according to both Styles — Saving Abundance of Trouble to the *chronological Computer*, in the Compass of 1 Page. What is *deficient* here, will be perfectly supplied in *ANOTHER WORK* we propose to publish, for the Use of *SEAMEN*; as an *Amendment and Improvement* of several Things, for the Use of the *PRACTICAL NAVIGATOR*; whose *Base and Satisfaction* we have therein considered to the utmost.

NUMBER I.

AN ALPHABETICAL CHRONICLE OF REMARKABLE EVENTS.

According to the surest Authorities.

Primaque ab Origine Mundi

Ad mea perpetuum deducite Tempora Verum.

N. B. b stands for before, and s since, Christ.

- A.** *Ref. & since Chr.* *Abimelech* kills his 70 Brethren, and governs the Jews b 1293
Abraham, his Calling out of Ur b 1927
 — goes into *Ægypt*, caused by Famine b 1926
Achilles, Grecian General, died b 1144
Acrisus marries *Eoridice* b 1047
Actium, Battle of, lost by Anthony b 31
Adam and *Eve* created, according to Moses, the different Accounts thereof, 4000, 5508, &c b 3956
Adam dies, aged 930 Years b 3020
Addison, *Jos.* born 1671, died June 17 s 1719
Adolphus, *Gustavus*, slain in Battle s 1632
Adrian, Emperor, visited Britain, and built a strong Rampart between the Tyne and Frith of Solway s 121
Adrianople taken by the Turks s 1359
Aeneas, Trojan General, alive b 883
Aera, Christian, first reckoned by s 532
Æthiopians invade *Ægypt*, and drown *Orus* in the Nile b 947
Agathocles, King of Sicily, massacred the Wives and Children of his Soldiers, for their putting two of his Sons to Death b 307
 — Crossing the Sea against the *Carthaginians*, an Eclipse of the Sun then happened, August 15 b 316
Agrippa, King of Judæa, reigned 74 Years, died b 44
Abab, King of Israel, reigns b 925
Abas reigns in Judæa b 747
Afax, Son of *Telsamon*, flourished b 1149
Alcibiades, Athenian General, died, aged 46 b 404
Alexander, Emperor of the East s 911
Alexander the Great, born 356, began to reign 336, conquers the Persians 332, and died at Babylon, March 21 b 224
Alexandria in *Ægypt* built b 335
Alexandrian Library, of 700000 Volumes, burnt by *Julius Cæsar* b 44
Alfred IV. Son of *Ethelwolf*, born 849, at Wantage in Berks; came to the Crown of England 871; took London from the Danes, besieged Rochester, and drove them to their Ships, 872; founds the University of Oxford, 874; formed a Body of Laws, and died s 900
 — He was succeeded by his Son, *Edward the elder*.
Alfred, Son of *Ethelred II.* had his Eyes put out by *Earl Godwin*, and 600 of his Train murdered at Guilford s 1036
 — He died soon after in a Monastery at Ely.
Alphonfus, King of Spain, freed that Country from the Tribute of 100 Virgins s 793
Amasis defeats *Apres*, and reigns in *Ægypt* b 668
Americus Vespasius discovered South America s 1497
Antion reigns in *Ægypt*, who

- who had Fleets of Ships
on the Mediterranean,
and Red Sea *b* 1034
Amosis, or *Tetbmosis*, 2d
K. of all Ægypt *b* 1070
Amos *b* 824
Anacreon, Poet *b* 529
Anne, Queen of England,
born Feb. 6, 1665, mar-
ried to the Prince of
Denmark, 1683. began
to reign March 8, 1702;
crowned April 23d fol-
lowing; died August 1,
aged 49 *s* 1714
— She was succeeded by
her Cousin, George I.
Electoꝛ of Hanover.
Antigonos routed by Sy-
rians *b* 316
Antigonos Pius, Emperor
b 138
Antiochus Epiphanes, be-
gan to reign in Syria
b 175
— Plunders the Temple
of Jerusalem, and mur-
ders 80000 of the Peo-
ple for revolting; put
Eleazar & the 7 Brothers
(called Maccabees) to
Death *b* 173
— He died in the greatest
Torments *b* 179
Antonius, Emperor *s* 161
Appian *s* 123
Aratus *b* 277
Archimedes *b* 218
Argo, the Ship, built by
the Greeks *b* 589
Argonautic Expedition to
Colchis *b* 937
Aristotle *b* 362
Armada of Spain destroy-
ed *s* 1588
Arogon reigns *b* 338
Arphaxad reigns over the
Medes *b* 589
Arrian *s* 117
Artaxerxes Longimanus
reigns *b* 464
— He kills his Brother
b 463
Artaxerxes Mnemon reigns
b 405
Artaxerxes Ochus reigns
b 359
Arthur, King of Britain
s 516
Arundelian Marbles com-
posed *b* 264
Asa, King of Judah,
reigns *b* 956
Asterbaddon reigns in Af-
syria, who built Tarsus
and Ancliale in 1 Day
b 711
— He invades Babylon
b 681
— He conquers the Jews,
and carries their King,
Manasseh, Prisoner to
Babylon *b* 673
— He invades and con-
quers Ægypt *b* 671
— He dies *b* 668
Astyrians beaten by the
Medes, under the Con-
duct of Astyages *b* 586
Astyages, King of the
Medes *b* 636
Astychus reigns in Ægypt,
which breaks into sever-
al Kingdoms *b* 788
Atelstian, King of Eng-
land *s* 924
Athenians beat the Per-
sians at Marathon *b* 485
Atheni, governed by Ar-
chons *b* 1080
— burnt by Mardonius,
Xerxes's General *b* 478
Augustine, St. *s* 379
Augustulus, last Emperor
of Rome *s* 476
Augustus Cæsar, Emperor,
and sole Master of the
World *b* 28
Augustus dies (Tiberius
succeeds) *s* 14
A. Bassianus Caracalla,
Emperor *s* 211
Aurora Borealis first ob-
served *s* 1716
B.
Babel, the Tower of,
building, and Confusion
of Languages *b* 2131
Bajazet, the Turk, reigns
s 1388
Baronius *s* 1790
Barons take Henry III.
Prisoner for breaking
Magna Charta *s* 1258
Battle of Blenheim *s* 1704
— Dettingen *s* 1743
— Ramillies *s* 1706
— the Boyne in Ireland
s 1690
Bede, Venerable *s* 699
Belgrade taken by the
Turks *s* 1521
Belshazzar, the last King
of the Babylonians
b 538
Berosus *b* 316
Boetius, Erasmus, Coper-
nicus, Contemporaries
s 1517
Brutus and *Cassius* being
defeated (having 3 Years
before, murdered Julius
Cæsar in the Senate-
House) kill themselves
b 40
C.
Cabot, *John*, (a Venetian)
discovered North Ame-
rica *s* 1498
Cadmus and *Europa* *b* 1048
Cæsar conquers the Gauls
b 53
— invades Britain *b* 52
Cæsar, *Julius*, defeats
Pompey *b* 49
Cainan, Son of *Enos*,
born *b* 3625
Caius Caligula, Emperor
s 37
Calendar in England cor-
rected *s* 1752
Cambises, King of Persia,
took Memphis *b* 524
— He subdued the Æthi-
opians *b* 523
Carthage and *Corinth*
burnt by the Romans
b 146
Cataline's Conspiracy, *Ci-
cero*, *Varro* *b* 61
Cephren reigns in Ægypt
and built another great
Pyramid *b* 824
Ceres teaches the Greeks
to sow Corn *b* 1030
Chaldeans

- Chaldeans* began to observe the Stars *b* 2131
Charlemagne, Emperor of Rome *s* 800
Charles I. beheaded *s* 1649
Charles II. King of England, restored *s* 1660
Charles IV. (King of Bohemia) Emperor of Germany *s* 1347
Charles IX. of France *s* 1560
Charles the Great, King of France *s* 767
Charops, first decennial Archon at Athens *b* 647
Chinese Wall built *b* 222
Cbiron made the Constellations *b* 939
Christ Jesus, our Saviour, born *b* 2
 — crucified *s* 34
Cbnyladon reigns in Assyria *b* 643
Civil Wars in Germany *s* 1494
Claudius, Emperor *s* 41
Cleopatra dies, and Ægypt becomes a Roman Province *b* 29
Cocceius Nerva, Empeior *s* 96
Columbus, Christopher, (a Genoese) discovers Sourh America *s* 1493
Comet (bright) in the Spring *s* 1744
Commodus, Emperor, *s* 180
Confucius, the Chinese Philosopher *b* 711
Constantine, Emperor *s* 699
Constantine the Great, Emperor *s* 306
Constantinople rebuilt *s* 330
 — Seat of the Roman Empire *s* 550
Copernicus alive *s* 1517
Coryrians are worsted by the Corinthians in the oldest Sea-Fight *b* 657
Corinthians begin to build Ships with 3 Orders of Oars *b* 697
Cornelius Nepos *b* 29
Cornelius Tacitus *s* 81
Craſus, King of Lydia, conquered by Cyrus, King of Persia; so ended the Kingdom of the Lydians *b* 550
Cromwell, Oliver, died *s* 1658
Cyrus, 1st King of Persia *b* 560
 — takes Sardes *b* 544
 — takes Babylon *b* 538
 — He overcomes Darius, the Mede, and translates the Empire to the Persians *b* 536
 — He dies *b* 529
Czar of Muscovy dies, and his Sons rule jointly *s* 1682
 D.
Damascus and Jerusalem taken by the Saracens *s* 636
Damascus taken by Tiglathpileſar, King of Assyria *b* 740
Danes invaded England and were beaten *s* 1002
Daniel *b* 609
Darius, the Mede, reigns *b* 566
Darius, Son of Hyſtaſpes, reigns in Persia *b* 521
Darius Nothus reigns *b* 424
Darius Codomanus reigns in Persia *b* 336
 — He was last King of Persia, and slain *b* 331
David made King *b* 1059
 — He conquers the Edomites, who fly into Ægypt *b* 1040
Deſdalus invents the Sarc, Wimble, &c. and introduces these Arts into Europe *b* 989
Democritus *b* 431
Des Cartes *s* 1619
Deucalion's Flood drowned Theſſaly *b* 1045
Dido builds Carthage; Pigmalion reigns at Tyre *b* 883
Diocleſian, Emperor *s* 284
Diodorus Siculus *b* 40
Diogenes Laertius *b* 138
Dion Caſſius *s* 123
Dionysius *b* 29
Domitian, Emperor, *s* 81
Drake, Sir Francis, ſails round the Globe *s* 1580
 E.
Earthquake in Asia, that overturned 12 Cities *s* 17
 — felt from September to November, ſwallowing up ſeveral Cities in Europe *s* 394
 — in Macedonia, ſo violent, that above 150 Cities were ſwallowed up by it.
 — throughout the whole Kingdom of England, followed by a great Scarcity of Fruit and late Harvest *s* 1090
 — in Shropſhire *s* 1110
 — felt in many Parts of England, France, and Germany, and felt alſo in Sicily, where 100000 Perſons periſhed by it; alſo felt in Jamaica, where Port-Royal was ſwallowed up *s* 1692
 — January 8, February 8, 2 Shocks felt in London *s* 1750
 — November 1, that laid all Liſbon in Ruins *s* 1755
Eclipse of the Sun, predicted by Thales, that put an End to the Battle between the Medes and Lydians, and Peace enſued, May 28 *b* 585
 — of the Sun, Auguſt 15, when Agathocles croſſed the Sea againſt the Carthaginians *b* 316
 — total, of the Sun, at London, April 22 *s* 1715
Edmund Ironſide, King of England *s* 1040
Edward the Martyr, King of England *s* 975
 Edward

- Edward the Confessor, K.** founded s 440
 of England s 1042
— III. King of England, many, recovers Jerusalem s 1299
 beat the French, and took the French King Prisoner s 1327
— V. King of England, s 1483
— VI. King of England, s 1547
Egbert, first sole Monarch of England s 819
Egypt, the King of, orders all the male Children of the Hebrews to be destroyed b 1573
Egyptians began to observe the Stars b 1034
— They carry their Astronomy to Babylon, and found the *Æra* of Nabonassar b 747
Elizabeth, Queen of England, restores the Reformation s 1558
Enoch, Son of Jared, born b 2328
Enos, Son of Seth, born b 3715
Epiphanes s 379
Erasmus alive s 1517
Eratosthenes, Epicurus, b 320
Esdrae b 464
Esther b 521
Etibetwolf, King of England s 837
Euclid b 316
Eusebius s 306
Exodus b 362
Exra returns to Judea b 457
Exra b 405
- F.**
Ferdinand III. Emperor s 1637
Flavius Vespasian, Emperor s 71
— He sent his Son Titus into Judea, who destroyed Jerusalem; since which Event, the Jews are dispersed all over the Globe.
France, Monarchy of,
- Frederic, Emperor of Germany,** recovers Jerusalem s 1299
Frederic II. Emperor s 1619
Frost, great, in England s 1684
— another great, in 1739 and s 1740
- G.**
Galba, Emperor s 69
Galen, Physician b 135
George I. King of England s 1714
— II. King of England s 1727
— III. King of England s 1760
Gideon, Judge of Israel, defeats the Midianites b 1271
Guido Aretino invents the Notes of Music s 1022
Gunpowder Plot s 1605
Gustavus Adolphus, King of Sweden s 1611
- H.**
Habbakuk b 729
Haggai b 566
Hannibal, the Carthaginian, defeats the Persians at Pavia b 216
— He defeats them at Canno in Italy b 215
Harold usurps the Crown of England s 1066
— the Dane, King of England s 1096
Henry I. crowned, August 5 s 1100
— II. King of England s 1154
— III. King of England s 1216
— He confirms Magna Charta s 1253
— IV. King of England, first of the Lancaster Line s 1399
— V. King of England s 1413
— He beats the French in the Battle of Agincourt s 1415
- Henry VI. King of England** s 1423
— He was deposed, and Edward IV. made King.
— VII. King of England s 1485
— VIII. King of England s 1500
Henry, Duke of Saxony, chosen Emperor s 1008
— VI. Emperor of Germany s 1190
Henry III. King of France s 1574
— He was stabbed by Clement, a Friar s 1589
— IV. King of France, stabbed by Ravillac s 1610
Heraclides return into Peloponnesus b 285
Herod, made King of Judea b 40
— He murders the innocent Children, with Intent to destroy Christ b 2
Herodian s 250
Herodotus, the Historian b 457
Hesiod and Homer b 837
Hezekiah reigns in Judea b 740
Hieram, King of Tyre, furnishes David with Timber to build b 1048
Hipparchus, Astronomer b 116
Hippocrates, Physician b 431
Holland revolts from Spain s 1579
Holy League in France s 1756
Honorius, Emperor of Rome s 396
Horace b 29
Hosea b 824
Huniades, J. Emperor of Constantinople s 1443
- I.**
Jacob, Son of Isaac, afterwards called Israel, born b 1842
Jaco

- Jacob* and his Family, moved by Famine, go into Egypt *b* 1712
- James I.* King of England *s* 1603
- II, deposed *s* 1638
- Jared*, Son of Mahalalel, born *b* 3490
- Jehosaphat*, King of Judea, reigns *b* 918
- Jeremiab* *b* 1636
- Jerom, St. Rufinus* *s* 337
- Jerusalem* a second Time built by the Command of Darius *b* 520
- taken by Pompey *b* 62
- taken by Herod *b* 37
- and Damascus taken by the Saracens *s* 636
- regained from the Turks *s* 1099
- retaken by the Turks *s* 1887
- Jeruſſa* History ends *b* 412
- Jews* return from Captivity *b* 536
- Inquisition* first erected against the Albanians *s* 1222
- Jeb*, Son of Issachar *b* 1751
- Joel* *b* 824
- John, K. of Eng.* granted Magna Charta *s* 1199
- Jonab* *b* 860
- Joseph*, Son of Jacob, born *b* 1751
- Josephus* *s* 71
- Josua* defeats the Gibeonites, and the Sun stands still *b* 1458
- He dies 110 Years old *b* 1433
- Josiah* reigns in Judea, *b* 640
- King of Israel, slain by Nechaoh *b* 609
- Iphitus* restores the Olympiads *b* 776
- Ishac*, Son of Abraham, born *b* 1902
- Isaiab* *b* 824
- Israel*, Children of, go out of Egypt, and Pharaoh and his Host are drowned in the Red Sea, pursuing them *b* 1496
- Judas Maccabeus* routs Antiochus *b* 166
- Judith* *b* 590
- cuts off the Head of Holofernes, Nebuchadnezzar's General *b* 660
- Julian*, Emperor *s* 337
- Julius Caesar* alters the Calendar *b* 46
- burns the famous Library of Alexandria, containing 700000 Volumes *b* 44
- He was killed in the Senate-House by Brutus and Cassius *b* 43
- Justin* *s* 138
- Justinian*, 2d Emperor, but afterwards expelled *s* 686
- L.
- Lamech*, Son of Methusalem *b* 3876
- Lewis IV.* Emperor, the Pope sets up another *s* 900
- XIII. King of France *s* 1610
- XIV. King of France *s* 1643
- London Bridge* built of Stone *s* 1187
- London* burnt *s* 1666
- Lucilius* *b* 135
- Lucius Florus* *s* 217
- Lucretius*, Livy *b* 29
- Lunisolar Year* altered to 365 Days *b* 1043
- Luther, Martin*, began his Reformation of the Christian Religion *s* 1517
- M.
- Maccabees* History ends *b* 625
- Macedon*, Kingdom of, founded by Caranus and Perdiccas *b* 596
- becomes a Roman Province *b* 168
- Magellan Straits* discovered by Francis Magellan *s* 1521
- Magi* are slain *b* 521
- Mahalalel*, Son of Cain, born *b* 3555
- Mabomet's* Flight to Medina *s* 622
- Mabomet II.* Sultan of the Turks, takes Constantinople *s* 1453
- Malacchi* *b* 362
- Manassib* returns from Captivity *b* 661
- Mariner's Compass* discovered *s* 1302
- Maris* reigns in Egypt *b* 860
- Mary*, Queen of England, restores Popery *s* 1553
- Queen of Scots, beheaded *s* 1588
- Mary*, Queen, dies *s* 1694
- Massacre* of the Protestants at Paris *s* 1572
- Mathusalem*, Son of Enoch, born *b* 3265
- He dies, aged 969 Years, the oldest Man *b* 2204
- Medes* revolt from the Assyrians *b* 712
- Menas, or Amemphis*, reigns in Ethiopia *b* 946
- Mephres*, King of Upper Egypt *b* 1125
- Mercator* *s* 1572
- Messana* built *b* 588
- Messenian* first War *b* 652
- Messenian* second War *b* 607
- Meton* *b* 457
- Micab* *b* 760
- Mino* reigns in Crete, his Father Asterius (Saturn) flies into Italy *b* 1015
- Mispbragmuthosis* reigns over all Egypt, and drives out the Shepherds *b* 1120
- Moor* defeated at Tours by the Spaniards *s* 716
- Moses* born *b* 1577
- He dies, 120 Years old *b* 1457
- N.
- Nabonadius*, King of Babylon *b* 555
- Nabonassar* reigns at Babylon *b* 747
- Nabonassar*

- Nabonassar* defeats *Neco* 349
b 747
Nabopolassar revolts from
the King of *Assyria*, and
reigns over *Babylon* 317
b 623
Nabum b 135
b 719
Nebuchadnezzar defeats
Arphaxad, the *Mede* b 135
b 661
— invades *Syria* and *Ju-*
des, under *Nabopolassar*,
his Father b 58
b 606
Nebuchadnezzar, King of
Babylon b 46
b 604
— He invades and con-
quers *Ægypt* b 46
b 566
Negropollassar defeated by
Cyrus b 1582
b 551
Nebemab b 1582
b 457
Nero, Emperor of *Rome*,
sets *Rome* on Fire for
Diversiō b 1640
b 64
Newton, *Sir Isaac*, born
b 1643
b 1643
— died b 1727
b 1727
Nice, Council of, held
b 325
b 325
Ninias, Athenian Gene-
ral, frightened at seeing
the Moon eclipsed b 412
b 412
Ninivurb destroyed; End
of the *Assyrian* Empire
b 609
b 609
Noah, Son of *Lamech*,
born b 2894
b 2894
— He builds the *Ark*
b 2414
b 2414
— The *Ark* finished, the
Flood over the Earth,
and the World drowned
b 2294
b 2294
Noah dies, 950 Years old
b 1944
b 1944
Normans settle in *Nor-*
mandy b 884
b 884
O.
Obadiab, *Elias* b 918
b 918
Ogyges, his Flood. *Eli-*
governs *Israel* b 1120
b 1120
Olympiads, restored by *I-*
phitus, reckoned from
this *Æra* b 776
b 776
Optimus Marinus, Empe-
ror b 217
b 217
- Orus* reigns in *Ægypt*,
and routs the *Lybians* b 956
b 956
Otho, Emperor of the
West b 973
b 973
Ottoman, Founder of the
present *Turkish* Empire
b 1297
b 1297
Ovid b 29
b 29
P.
Paleolus, *M.* regains *Con-*
stantinople b 1260
b 1260
Paleolus III. *A.* Emperor
at *Constantinople* b 1326
b 1326
Pantbeon, Temple of
Rome, beat down by
Thunder b 110
b 110
Paris, King *Priam*'s Son,
stole *Helen* out of
Greece b 918
b 918
Paul's, *St.* Church begun
to be rebuilt b 1675
b 1675
Peace with the *Dutch*
b 1674
b 1674
— with *France* and *Spain*
b 1763
b 1763
Peloponnesus and the *Mo-*
rea conquered by the
Turks b 1459
b 1459
Pepin, King of *France*,
b 716
b 716
Pbaortes, King of the
Medes, slain in the *As-*
syrian Wars b 636
b 636
Pbilip, King of *Macedon*,
reigns b 362
b 362
Pbilip III. King of *Spain*
b 1598
b 1598
— IV. King of *Spain*,
b 1621
b 1621
Phillistines conquer *Israel*
and take the *Ark* b 1100
b 1100
Pbilo b 37
b 37
Pbilofstratus b 193
b 193
Pbœnicians, that fled from
David, carry their Arts
and Sciences into *Greece*,
and begin to sail on the
Mediterranean b 1045
b 1045
Pictis build a Wall in *Brit-*
tain b 123
b 123
Pindar b 521
b 521
Plague, a great one at
London b 1665
b 1665
Plato b 405
b 405
- Pliny* b 39
b 39
Plutarch b 117
b 117
Polybius b 135
b 135
Pompey's *Triumvirate*,
Rome enslaved b 58
b 58
Pompey slain by *Cæsar* in
Pharsalia b 46
b 46
Pope Gregory XIII. cor-
rects the *Calendar* b 1582
b 1582
Portugal revolts from
Spain b 1640
b 1640
Printing invented b 1449
b 1449
Procopius b 550
b 550
Pfammaticus conquers the
other 11 Kings, and be-
comes King of *Ægypt*
b 655
b 655
— He was conquered by
Cambyfes, King of *Per-*
sia b 621
b 621
— He dies b 617
b 617
Ptolemy Philadelphus
reigns in *Ægypt* b 277
b 277
Ptolemy Soter b 320
b 320
Pul founds the *Assyrian*
Empire b 790
b 790
Pul, King of *Assyria*, dies,
Tilagpilesar succeeds
b 747
b 747
Punic, or *Carthaginian*,
first War b 264
b 264
— 2d War b 217
b 217
— 3d War b 149
b 149
Q.
Quintus Fabius Pictor,
the oldest *Latin* *Histo-*
rian b 264
b 264
Quintus Curtius b 71
b 71
- R.
Rebellion at *Preston* b 1715
b 1715
— at *Culloden* b 1746
b 1746
Reboboam reigns in *Israel*,
which is divided, and
10 Tribes revolt b 979
b 979
Riccius b 1666
b 1666
Richard (Brother to *Hen-*
ry III.) Emperor b 1256
b 1256
Richard I. King of *Eng-*
land b 1189
b 1189
— II. King of *England*
b 1377
b 1377
— deposed b 1399
b 1399
— III. King of *England*
b 1483
b 1483
River,

- River, New*, brought to London : 1614
- Radolphus II.* Emperor, : 1566
- Rome* built by Romulus (by common Account, 752) : 627
- Civil Wars at, between Pompey and Cæsar : 82
- taken by the Goths : 410
- Romish Superstition*, Opposers of, burnt at Austria : 1315
- Russians* at Portsmouth, on a dark Friday Evening, March 31 : 1769
- again, on a dark Friday Evening, January 18 : 1771
- Set on by the Witch Circe, they plot against a Portsmouth Inhabitant; but, Satan being overpowered by Providence, one of the Principals in the Plot (the bloody Butcher) set off for London, encouraged by the Rest, (since the late Dock-Fire), to prevent Discoveries, and receive his Reward.
- Rufinus* : 337
- Ruth* : 1271
- S.
- Sabos Duchinus*, King of Assyria, reigns : 668
- He dies : 647
- Salladin*, Sultan of the Turks : 1170
- Sallust* : 46
- Salmanassar* succeeds Tigliphalesar : 729
- He takes Samaria, and carries the 10 Tribes captive to Nineveh : 721
- Sampson* destroys himself with 300 Philistines : 1116
- Samuel* judges Israel : 1094
- He dies : 1060
- Sanchoniathon* : 760
- Saul*, King of Israel : 1070
- being defeated by the Philistines, kills himself : 1060
- Scaliger* : 1580
- Semiramis* flourishes : 760
- Senacherib* slain. The Medes revolt from the Assyrians : 717
- Seneca* : 37
- Septimus Severus*, Emperor : 193
- Sesac*, Son of Ammon, invades Arabia Felix, and sets up Pillars by the Red Sea : 1010
- He reigns in Ægypt : 1002
- He invades India, and sets up Pillars on the Ganges : 971
- He conquers Thrace, kills King Lucurgus, has Æthiopians in his Army commanded by Pan, and Lybian Women commanded by Minerva : 968
- was slain by his Brother Iapetus, or Neptune : 956
- Setb*, Son of Adam : 3820
- Seutonius Tranquillus* Ptolemy : 96
- Socrates* : 405
- Sodom* and Gomorrah burnt : 1903
- Solon* : 609
- Archon of the Athenians, makes Laws for them : 562
- Solomon* reigns, and marries the Daughter of Ammon, King of Ægypt : 1019
- his Temple founded : 1015
- finished : 1009
- He dies : 979
- Solomon*, Emperor of the Turks : 1520
- Spanish Armada* destroyed by the English : 1588
- Spanish Fleet* destroyed near Sicily : 1718
- Sparta* built : 1060
- Syracuse* built by Archias : 719
- taken by Marcellus : 213
- Sysiphus* reigns in Corinth : 983
- T.
- Tamerlane*, the Tartar, reigns : 1388
- He defeats Bajazet, conquers Babylon, Persia, China, and India, (The Great Mogul descended from him) : 1499
- Tarentum* built by Phalantus : 620
- Tarquin*, the last King of the Romans expelled, and Consuls elected : 508
- Terrene* : 166
- Thales Milesius* : 596
- Thesdoret* : 425
- Theodosius*, Emperor : 379
- Theodosius III.* Emperor : 714
- Theseus* reigns at Athens, and overcomes the Minotaur : 968
- Theseus*, King of Athens, stole Helena : 938
- Thucydides* : 508
- Tiberius II.* Emperor : 575
- Tigliphalsar* succeeds Pul, and reigns at Nineveh : 747
- Tirkakab* reigns in Ægypt : 687
- Titus Vespasian*, Emperor : 79
- Trent*, Council of, : 1540
- Triumvirate* of Mark Anthony, Lepidus, and Augustus : 40
- Trogus Pompeius*, lived just after Christ's Birth.
- Troy* besieged by the Grecians : 914
- taken : 904
- Turks* conquer Persia, and take Jerusalem : 1070
- Turks

<i>Turks at War with the Emperor</i>	<i>: 1682</i>	<i>Cornelius Nepos, Co-temporaries</i>	<i>b 29</i>	<i>Xerxes reigns (called also Ahasuerus)</i>	<i>b 485</i>
<i>Jacobs Brabe</i>	<i>: 1580</i>	<i>Vitellius, Emperor</i>	<i>: 70</i>	<i>— defeated by the Greeks</i>	<i>b 484</i>
<i>Tyre built by Aradus</i>	<i>b 1048</i>	<i>Union of Scotland with England</i>	<i>: 1707</i>	<i>— passes over the Hellespont, fights Leonidas, King of Sparta, who beats him</i>	<i>b 480</i>
V.		W.		Z.	
<i>Valentinian and Valens, Emperors</i>	<i>: 364</i>	<i>War, holy, against the Turks</i>	<i>: 1096</i>	<i>Zecbariab</i>	<i>b 566</i>
<i>Valentinian III. Emp.</i>	<i>: 425</i>	<i>William the Conqueror, King of England</i>	<i>: 1066</i>	<i>Zedekiah reigns in Judea</i>	<i>b 596</i>
<i>Vandians defeat the Turks at Sea</i>	<i>: 1572</i>	<i>William and Mary, King and Queen of England</i>	<i>: 1689</i>	<i>Zephaniab</i>	<i>b 636</i>
<i>Venice built</i>	<i>: 41</i>	X.		<i>Zoroaster</i>	<i>b 521</i>
<i>Vicia</i>	<i>: 1603</i>	<i>Xenophon</i>	<i>b 405</i>	<i>Zozimus</i>	<i>: 379</i>
<i>Virgil, Horace, Ovid, Lucan, Livy, Dionysius,</i>					

N. B. In future Palladiums, to suit the first Part of our Work, we propose to give ALPHABETICAL CHRONICLES of the more modern and extraordinary EVENTS: Such as, remarkable Battles; Sea-Fights, Accidents by Thunder and Lightning; of Earthquakes happening, and Volcanos emitting Flames and vomiting Liquid Fire; of Winds, Storms, Tempests, and Hurricanes; of Heats and Dryness, Rains, Floods, and Inundations; Great-Frosts, Plenty, Scarcity, and Famine; Sickness, Plague, and Pestilence; miraculous Phenomena, and strange Occurrences; of Destructions and Escapes; Births and Deaths of eminent Persons; and of God's Providence presiding over Men and Things. With separate and successive CHRONICLES of the first King of each Country, as far as they are known; and the present Kings thereof. Also, a successive CHRONICLE of all the Roman Emperors, from the Foundation of Rome. A successive CHRONICLE of all the Kings of England since the Heptarchy. Another CHRONICLE of all the Kings of Scotland. When each Emperor and King began his Reign, and the Years he reigned. And other curious and useful Chronological Accounts.

PART II.

ANSWERS to all the ÆNIGMAS in last Year's PALLADIUM.

- | | |
|----------------------------------|-------------------------|
| I. FURS, or HEATH, on the Moors. | V. A CONSTABLE'S STAFF. |
| II. A FLOWER-POT. | VI. A WEATHER-HOUSE. |
| III. The SUN. | VII. A WINDOW. |
| IV. A Note of INTERROGATION. | Prize, LEAVEN. |

ANSWERS to all the ÆNIGMAS, by the Rev. Thomas Vaughan, A. M. of Morpeth, Northumberland.

To SOPHIA.

DEAR SOPHY, your Request can I deny?
To solve th' Ænigmas therefore I will try.
The first is Heath, of ev'ry Moor the Pride,
A Pot with Flowers, next, sparkling like a Bride,
The third does represent the radiant Sun,
The fourth is POPE's Interrogation;

The

The fifth a *Staff*, for many Uses fit.
 The sixth a *Weather-House*, that foretels it.
 The seventh a *Threshhold*, or a *Window-Light*,
 Leaves the Prize. — Dear SOPHY, am I right?

ÆNIGMA V. answered by Mr. John Shadgell [or Shadgett] of Ross, Herefordshire.

OF all the Contrivances us'd in the Nation,
 To suppress Rage and Tumults, and Vices in Fashion,
 Though the Means and the Methods are legal and many,
 The *Constable's-Staff* is as useful as any.

Mr. Richard Dalton, of *Pool*, (who writes an elegant Hand), answered the 3d and 4th *Ænigmas*. Mr. John Skermer, of *Abby de la Zouch*, answered 1, 3, and *Prize*. Mr. Thomas Adcock, of the same Place, answered all the *Ænigmas* in Verse. Mr. Thomas Stuchfield, of *Ratcliff*, 1, 61 Mr. G. Lacey, of *Bridport*, answered several in Verse. Mr. Swift answered most of the *Ænigmas* and *Rebuses*, and all the *Paradoxes*, in Verse, and proposed some Things we have not Room for. Mr. J. Scott, of *Cawthorne*, answered the 1st, 3d, 5th, and 6th *Ænigmas*. Mr. James Mascroft, of *Rotterdam*, solved the 3d, 5th, and 6th *Ænigmas*. Mr. Michael Taylor, of *Marley-Hill*, near *Newcastle*, answered them all. Mr. W. Wells, of *Crowle*, *Lincolnshire*, answered the 1st, 4th, 5th, 6th, 7th, and *Prize*. Mr. J. Bailey the *Prize*, 1st, 3d, 5th, 6th, and 7th.

All the *ÆNIGMAS* answered by Mr. Stephen Hartley, of *Sowerby-Bridge*.

On the Principal belonging to a Set of unnatural Authors.

WHAT Witch could move thy Wrath to write,
 Or Muse, in Mask, to shew her Spite? *Interrog. 4.*

Thy Libel, if perform'd at School,
 Shews that thou dost not write by Rule. †
 Hadst thou no Reason — Nought to fear,
 When thou with *Ruffians* didst appear?
 The Hemp was sure, had Balls mis-spel,
 Or had not Steel turn'd whire Frocks red.

Thy Deeds deserye an Iron Wreath,
 Thyself uprais'd where grows the *Heath*: 1.

Like those who out of Day-light run,
 To do those Things that shame the Sun. 3.

First, may thy Throne exalted be
 To see below whom thou canst see!

Thy Hands and Feet extended wide,
 With wooden Neckcloth round apply'd;
 Where, *peeping*, thou mayst sh-w thy Face 7.

Of Wainscot Hue, and Front of Brass:
 Where *Staffs* the waiting Crowd command, 5.

Some pelting thee on either Hand;
 To make thee from thy Ways decline,
 To sigh for *Shes*, not *Hes* to whine.
 Like Miss Stow's *Man*, love Beauty's *Flow'r* 6. 2.

And own its Force and magic Pow'r.
 Reform — or still want Health and Bread, *Prize*.

And Things that Honest Folks do need.

And when thy Vice is Hate to thee,

I wish thee Health, Wealth, Liberty.

† *Thou cries*, [20] *forgets*, [18] *thou sleeps*, [23] *thou barrels*, [52] *thou dost*, [25]
Thou knows, [211] *But says*, [153] *what all affords*, [70] *forsooth*.

Answer

THE BRITISH PALLADIUM, OR

Answer to the PRIZE-ÆNIGMA, by Mr. G. Lacey, of Bridport.

IF Sophy's be the with'd-for *Leav'n's*,

To me then let the *Prize* be giv'n.

By Mr. Coughron, of Newcastle upon Tyne.

IF Sophy's *Leav'n* be the right,

The *Prize-Ænigma's* brought to Light.

All the ÆNIGMAS and REBUSES answered by Gemini, of Morpeth.

On a Set of Libellers and unnatural Authors.

1. IF Impudence can pass for Sense,
And Spleen and Spite for *Wit* and Satyr,
The Rational have fair Pretence
To write against the Outs of Nature,
2. When Haters of the female Sex
The Passions natural disdain,
The Fair, more just, an Odium fix
On S-d-m's Sons and Seed of Cain.
3. Enamour'd of the Masculine,
The Foes declar'd to female Charms,
For Men and Youth, not Beauty, pine,
And Innocence corrupt with Harms.
4. Assembled how these Lovers greet,
Their Arms around each other's Waist !
Their Looks so languishingly sweet,
As if the Joy they long'd to taste !
5. A Beauty, with his Br——s large,
Makes all their Mouths to run with Water :
They all upon his Praise enlarge,
As, above all, worth running after.
6. Sighers for Men, Men Oglers turn, †
Who marry but to hide their Crimes ;
Their Fondness shun, Love-Letters burn,
Though you'll be libel'd for't in Rhimes. †
7. Confed'rate Friends their Libels spread ;
Each swears for other black is white :
They threaten Law, when most they dread,
And Ruffians hire, to plot by Night.
8. Our Author justly may despise
These Infamites of Guilt and Shame :
Their Libels bear the Date of Lies ;
His Works preserve a lasting Name.
9. T'interrogate — A Word with you :
Are ye in Shame but new Beginners ?
Don't you Untruth and Malice shew,
And prove yourselves case-hardened Sinners ?
10. Your Libels, burnt, are but in vain ;
Palladiums, for their Use, will last :
Your Work is all to do again ;
The next will be as is the last.
11. Male Lovers shame ev'n-Profligates ;
But Honours wait the nat'ral born ;
You rank below the nat'ral Brutes,
And, among scorn'd, are most the Scorn.
12. Your *Morias*, *Marias*, *Mollies*, *Dames*,
The Goddesses to whom you're wed,

3. *Reb.*

† See *Churchill's Times*.

† Several printed
Libels have been
dispersed against the
Palladium-Author
for shunning Ac-
quaintance with
these infamous Lo-
vers.

4. *Æn.*

* William the Con-
queror, King of Eng-
land, was natural Son
of a Skinner's Daugh-
ter.

Your

- Your Partners of illustrious Names,
Are finely fraught and brought to Bed. || *With Cuckow-Birds.*
13. Though some are barren as their Lords,
They ne'er are backward for their Dulness;
While Sophy wins her Dear by Words,
Some like her for her Limbs and Full-dress.
14. Sophy's superior Parts can please,
Who far exceeds the Rest in Riches;
She gain'd her dear Dupee a Place, * *Mr. George Horner Dupes.*
By changing less for bigger Breeches.
15. Her Table and her Charms she spreads,
And bribes with Dinners and with Smiles!
And Troops of Lovers captive leads,
While the poor Yea-and-Nay beguiles.
16. The high Road to Preferment is
By Pathics wed to passive Wives;
What one escapes the other has,
Who make the most of both their Lives.
17. Twin-born am I, and boldly stand,
With Staff erect, to guard the Fair; 5. *Æn.*
While Pleasure I for them command,
How curst the Wretch who would debar!
18. Your *Leaven* Christians all refuse, Prize. † *A Jew at Portsmouth, who sells old Cloaths, and distributed Libels for one of the Confederates,*
Of Levi's Tribe † — who lent you Aid; *who, to make him Amends, Borrow'd of him an old red Waist-*
19. Your Deeds the Sun has seen by Day, 3. *Æn.*
Your Works are known in darkest Weather; 6. *coat, after the Lace was cut off.*
Your Letters ¶ writ your Shame betray, *† A Finder of the Longitude.*
Thro' Windows looking all together. 7. *Æ.* ¶ *Threatening Letters.*
20. Furr on the Heath can Witness bear 1. *Æ.*
How Thieves from Cities roam for Prey; *¶ Dock-Yard Firers, Assassins, &c.*
And Anti-Infamites declare, † *A Finder of the Longitude.*
Where Infamites || by Night way-lay. ¶ *Threatening Letters.*
21. To ask Miss Hay I'm not afraid, 2. *Reb.* || *Dock-Yard Firers, Assassins, &c.*
If Billington or Pool she chuses, 7. 4. *Reb.* 5. 1. *Reb.*
Where Abben's Bride is to be made, 5. 1. *Reb.*
If one at Letters he refuses, 6. *Reb.*
22. I will protect the fairest Flow'r,
A tender Flow'r, not yet full-blown;
I'll guard it carefully each Hour,
Until within a Pot 'tis shewn. 2. *Æn.*

Mr. G. Coughron, of Newcastle, (late of Wreigbill, Northumberland), answered all the *Ænigmas*.

ANSWERS to the QUERES in last Year's PALLADIUM.

- I. QUERE 214, answered by Mr. George Newland, at Mr. Nichols's School, in the Isle of Wight.

HAROLD I. the second Danish King of England, was first buried at Westminster; but his Body was soon after taken up, by Order of King Hardicanute, and flung into the River Thames; whence it was taken up by a Fisherman, and conveyed to a Church-Yard in London belonging to the Danes, (probably now St. Clement's Danes in the Strand), where it was again interred with Honour. Divi Britannici, P. 179, 180. Milton, P. 321, 322. II.

II. QUÆRÆ 215, answered by Mr. George Newland.

THE Names of the *Week Days*, which we now use, were derived from our Ancestors, the Saxons; who, among other *Deities*, worshipped the *Sun*, *Moon*, *Tuisco*, *Woden*, *Tbor*, *Frige*, and *Seatur*; from whence came *Sun's Day*, *Sunday*; *Moon's Day* (by Corruption) *Munday*; *Tuisco's Day* (by Corruption) *Tuesday*; *Woden's Day*, *Wednesday*; *Tbor's Day*, *Thursday*; *Frige's Day*, *Friday*; *Seatur's Day*, *Saturday*; also by Corruption. See *Virtegan's Nationum Origo*, P. 74 to 86.

Or, the Answer to the Latin QUÆRÆ, in Latin, thus.

Dies Solis Nomen habuit, quia hoc Die Saxones Soli sacrificabant.

Dies Lunæ, quia hoc Die Lunæ sacrificabant.

Dies Martis, quia Tuisconi hoc Die sacrificabant.

Dies Mercurii, quia Wodeni hoc Die sacrificabant.

Dies Jovis, quia Thorti hoc Die sacrificabant.

Dies Veneris, quia hoc Die Frigæ sacrificabant.

Dies Saturni, quia hoc Die Seatro sacrificabant.

III. QUÆRÆ 216, answered by Mr. G. Newland.

LET the upper Pulley be fixed to a Beam, and a Rope pass from every Pulley to the Weight to be raised; by which Means 1 lb. by 4 Pulleys, will raise a Weight of 15 Pounds.

This Quæræ, Mr. Hardy, of Cottingham, says, was taken from *Fléteber's Mensuration*; as, he says, are some of the Quæræ proposed.

IV. QUÆRÆ 217, answered by Mr. G. Newland.

THE least Triangle, circumscribing a Circle, is equilateral; consequently, the least Cone, circumscribing a Sphere, is equilateral also. Its required Dimensions are as follow; viz. the Base and each Side = 3.397 Feet; whence the perpendicular Height = 3.3749 Feet. W. W. R.

Or, in Latin.

Latus minimi Coni (qui equilateralis est) circumscribens datam Sphæram (Pedum 2½ Diametrum habentem) Pedes 3.397 continet; et perpendicularis altitudo, 3.3749 Pedes habet.

Mr. Stephen Hartley says, he has seen the above Quæræ in a *Latin Diary*.

Mr. Robinson, of Biddick, determined the Side of the least Cone, circumscribing a Sphere, = 3.398.

We are obliged to Mr. Kilwin (a young Gentleman of 18) for his Productions; but our Plan is not to insert Quæræ answering Series, or Fluxional Equations, (the Handling of which is seen among the Writers on the Subject), without a direct Application thereof is made, practically, in the Question.—We esteem his Abilities and Favours, and hope to oblige him more hereafter in what is practical, or applied to Use.

Mr. Alexander Rowe writes thus.

Premièrement, $2\frac{1}{2} \times 2 = 4\frac{1}{2} = \text{le Hauteur, et } 2\frac{1}{2} \sqrt{2} = 3.3819$. Sc. Péd. sont le Diamètre du moindre Cone. Q. E. F.

Mr. William Hardy, of Cottingham, finds the Cone's Altitude and Diameter at the Base as above.

V. QUÆRÆ 218, answered by Conjecture.

THE Oysters, and other Substances, dug up at *Catsgrove*, near *Reading*, in *Berkshire*, are, in my Opinion, the Consequence of some subterraneous Eruption. (as are the Variety of *Strata* in other Parts) whereby the Sea has shifted its Place and Boundary, and left the Diversity of *Sea Strata*, Oysters, and other marine Substances as they are found and appear from the said shifting Cause. Which

which Cause is the Change of Situation of the Sea; overflowing *vast Tracts* of dry Ground, and leaving others, that were covered with Sea, to unbosom its Variety of Fossils, or Textures of an earthy Substance; or else to be covered with *Verdure*, as the Seeds of Vegetables, scattered up and down the Substance of the whole Earth, and the impregnating Air, took Effect.

VI. QUERE 219, answered by Mr. George Hicks, of Reedness.

THE Word *Residue* retains the same Sense as the Word *Rest*, or *Remainder*; therefore it certainly is a *Substantive*; and no *Adjective*, like *residual*.

VII. QUERE 220, answered by an English Grammarian.

ACCORDING to Custom, in the *English* Mode of Speech, which is the greatest Authority, Bishop *Lowth* is got into a *Dilemma* here, betwixt the *English* and *Latin* Customs of Speech, where the *English* Custom, by the Rule of Transposition, ought to predominate: *Do you think me to be who?* or, *Who do you think I am? Somebody or Nobody?*

PRIZE-QUERE answered by the Palladium-Author.

SINCE the Years, &c. 3, 2, 1, before, and 1, 2, 3, &c. since *Christ*, immediately precede and succeed one another, there is no 0 Year of *Christ*, which is a *Non-entity*; and since, of the 1, 2, 3, 4 Years since *Christ*, the 4th Year since is *Bissextile*; therefore the 1st Year before *Christ* will be *Bissextile*; also 101, 201, 301, &c. *Bissextile*, and not 0, 100, 200, 300, &c. before *Christ*, as Mr. Mayer, and Mr. Maskelyne, after his Error, have published. Hence, from the Beginning of the 0 Year, which improperly represents the 1st Year before *Christ*, to the Beginning of the 1st Year since *Christ*, will be exactly 1 whole *Bissextile* Year of 366 Days: Also, from the Beginning of the 1st Year before, (denoted by the 0 Year,) to the Beginning of the 100th Year since, *Christ*, is exactly 100 *Julian* Years. And therefore the Year (as before observed) that next preceded the 1st Year of, or since, *Christ*, was the 1st Year before *Christ*, or the last *Bissextile* Year next preceding his Birth.

If Mr. Maskelyne, who has printed Mr. Mayer's Tables, erroneous in their Chronology by 1 Year, and sits with Authority, as Commissioner at the Board of Longitude, to determine on Matters of Importance, can decide this Matter otherwise, it is hoped that the Truth will induce him so to do; and to tell us what the 0, 100, 200, &c. Years before *Christ* (*Bissextile*, or otherwise) signify; as they all appear to be printed for Years *Bissextile*.—If the 0 Year is a Year of *Non-entity*, and yet denotes *Bissextile* and also the Year of *Christ's* Coming, and the 1st, 2d, 3d, and 4th Year before and since that 0 Year *Bissextile*, or before and since a *Non-entity*, the Paradox in Mayer's Tables and Chronology, (that cost the Nation 3000l.) of 100, 200, 300, &c. before *Christ*, being all *Bissextile* Years, may be made out; but not other wise. The 0 Year cannot express the Beginning of any Year.

Mr. Judson, of Beverley, answered the same by Tab. p. 347, *Royal Astronomer*, from the *Julian* Period.

But the Rev. Mr. O. Piper, non A. R. *Greenovicensis*, is considerably out of his Calculation, in his Answer to this Quere, both in Longitude and Latitude. He makes the 0 Year before *Christ* (as expressed by Mr. Mayer in his Tables) to be the 1st Year of *Christ*, or of *Christ's* Nativity, though a Year of *Non-entity*, and though the 1st Year before, and 1st Year since, *Christ* next precede and follow one another: And so from the Beginning of the Year of *Christ's* Nativity, to the Beginning of the 1st Year since (or of) *Christ*, he makes, according to Mayer's Tables, he says, exactly 366 Days, [though, in Fact, the Year preceding the Year of *Christ's* Nativity was *Bissextile*:] And from the Beginning of the 0 or no Year of *Christ*, to the Beginning of 100 Years since *Christ*, he makes 100 *Julian* Years; and confidently says, that every one of

31 THE BRITISH PALLADIUM, OR
*which Things are right, as they stand in Mayer's Tables; though evidently
 erroneous by 1 Year.*

ANSWERS to the REBUSES in last Year's PALLADIUM.

- | | |
|----------------|------------------|
| I. A BRIDE. | V. ASHTON. |
| II. HAY. | VI. LEWES-Town. |
| III. WIT. | VII. BILLINGTON. |
| IV. POOL-Town. | |

REBUS I. answered by Mr. Thomas Stuckfield, of Stepney.
 THE Fair, who wishes not to be a *Bride*,
 Nor Nature has, nor Reason, for her Guide.

REBUS VII. by the same.
 TO please Miss *Billington* is very hard,
 Who twenty Lovers did last Year discard.

All the REBUSES answered by the Rev. Thomas Vaughan, A. M. of Morpeth,
 Northumberland.

Pool, Lewes, Hay, three Rebuses explain, 4. 6. 2.
 And *Ashton's* witty *Bride* three more contain: 5. 3. 1.
 The list of all is *Billington*, we find, 7.
 And all the Answers as they were design'd.

The 1st, 4th, and 6th Rebuses were answered by Mr. John Shadgell, of
 Ross, Herefordshire.

All the REBUSES answered by Mr. George Newland, at Mr. Nicholson's
 School, Teacher of the Mathematics and Land-Surveyor, at Newport, in the
 Isle of Wight.

MISS *Hay's* fair Form *Wit*, Sense, and Beauty grace: 2. 3.
 Her Sex's Ornament, that ours can please.
 At *Pool* and *Lewes* some fair Females dwell, 4. 6.
 But *Billington* the *Bride* can none excel. 7. 1.
 May *Ashton* next a tender Mother be 5.
 Of a fine, lovely, num'rous Progeny.

Mr. John Skermer, of *Asbby de la Zouch*, answered the 4th, 6th, and 7th
 Rebuses. Mr. T. Adcock 1, 4, 6, 7, in Verse. Mr. T. Stuckfield, of *Ratcliff*,
 4, 6, 7. Mr. G. Lacey, of *Bridport*, 1, 3, 4, 5, 6, 7, in Verse. Mr. R.
 Dalton, of *Pool*, 1, 4, 6, 7. Mr. James Muscroft, of *Rotterham*, 4, 6, 7.
 Mr. Stephen Hartley, of *Sowerby-Bridge*, 1, 3, 4, 6, 7. Mr. W. Turner, of
Witney, *Oxfordshire*, 1, 4, 6. Mr. Alexander Rows, 1, 3, 4, 6, 7. Mr.
 Mich. Taylor, of *Marley-Hill*, near *Newcastle*, 1, 2, 3, 4, 6, 7. Mr. W.
 Wells, of *Crozele*, *Lincolnshire*, 1, 2, 3, 4, 6, 7. Mr. J. Bailley, of *Mid-*
dleton, *Yorkshire*, 1, 3, 4, 6, 7. Mr. G. Coughron, of *Newcastle*, answered
 all the Rebuses.

ANSWERS to the PARADOXES in last Year's PALLADIUM.

I. PARADOX answered by Mr. G. Lacey, of *Bridport*.
 A Dyer, 'tis clear to me, might die,
 Be'ore his Son was born, or I,

Mr.

Mr. W. Wells, of Crowle, Lincolnshire, answered it much in the same Manner.

Mr. John Skermer, of Ashby de la Zouch, answered it; as did Mr. James Muscroft, of Retterham; Mr. W. Turner, of Witney, Oxfordshire; Mr. Mich. Taylor, of Marley-Hill, near Newcastle; Mr. Richard Dalton, of Pool; Mr. Alexander Rowe; Mr. John Bailey, of Middleton, Yorkshire, acrostically.

J. PARADOX answered (in the Taste of the Proposer) by Mr. G. Newland, at Mr. Nicholson's School, at Newport, in the Isle of Wight.

To Mr. Oliver, the Proposer.

YOUR Father, Sir, once liv'd by dying;
And now, perhaps, he dies by living.

II. PARADOX answered by Mr. George Newland.

LET the Concavity of one Bag (of equal Weight with the other) be a cubic Foot; and the Concavity of the other Bag $\frac{1}{2}$ cubic Foot. By Mr. Emerson's Weights and Measures, p. 18, a cubic Foot of Air weighs 1.25 Ounces, which multiplied by $\frac{1}{2} = .75$, the Difference of Size between the two Bags, gives .93750. Hence the Pound of Feathers in the larger Bag weighs 1 Pound; and the Pound in the lesser Bag weighs 1lb 0.9375 Oz.

Corollary. Hence an Advantage accrues to the Seller of Wool, and of other compressible Bodies, when they are closely pressed; and, consequently, a Disadvantage to the Buyer: For the closer compressible Bodies are pressed, the more they will weigh.

Mr. Stephen Hartley also observes, that the Feathers, in one Bag, hard pressed together, and in the other loose and mixed with Air, solves it, when both Bags weigh equal.

Mr. Richard Dalton accounted for it by a false Balance, with one Arm of the Beam longer than the other; a common fraudulent Practice, in many Parts of this Kingdom, to the Scandal of Magistrates who suffer it. Mr. Michael Taylor says Feathers, Wool, &c. will weigh more when pressed hard together than otherwise. Mr. Alexander Rowe answers it to the same Purpose.

Mr. William Wells to the Dealers in Feathers, Wool, &c.

YE Dealers in Feathers and Wool, by the Freight,
The less Room you pack in, the more is the Weight.

Mr. G. Coughron, of Newcastle, answered both Paradoxes: Who judiciously observes, that Feathers and all light compressible Substances weigh the most when they are most compressed, or put into the least Compass they will admit of. Hence the Difference of Weight, of the same like-weighing Substance, separately weighed, and weighed when put in Cases of equal Weight, but of different Magnitudes, is universally accounted for.

ANSWERS to the QUESTIONS in last Year's PALLADIUM.

*Arithmetic, that curious, useful, Art,
Delights the Mind, and Wonders does impart:
By its extensive and sagacious Aid
A Nation flourishes in Wealth and Trade.*

1. QUESTION 423, answered by Mr. George Newland, at Mr. Nicholson's School, in the Isle of Wight.

PUT x = the Number of Eggs; then 120 Eggs, at 2 for a Penny, come to 60d; and $\frac{x}{3}$ is the Price of the Eggs at 3 for a Penny. Whence, $120 + \frac{x}{3}$
E 2 at

at 5 for 2d. $= 48 + \frac{2x}{5}$. And by *Loss and Gain*, $60 + \frac{x}{3} : 48 + \frac{2x}{5} ::$

300 : 119; whence, by multiplying Extremes and Means, $14400 + 120x = 21420 + 119x$; and, by Reduction, $x = 7020$ Eggs, required.

The same was elegantly and correctly answered in this Method, or a little differently, by *Gemini*, of *Morpeth*; Mr. *Robinson*, of *Biddick*; Mr. *Dalton*, of *Pool*; Mr. *John Lynn*, *Pitman*, of *Ruffle*, *Northumberland*; Mr. *Thomas Adcock*, of *Ashby de la Zouch*; Mr. *J. Scot*, of *Cawthorne*; Mr. *John Lowe*, Schoolmaster, at *Birmingham*; Mr. *Charles Taylor*, Pupil to Mr. *N. Brownell*, of *Coventry*; Mr. *George Hicks*, of *Reedness*; Mr. *James Muscroft*, of *Reverham*; Mr. *Pen*, the Proposer, of *Chalfont*; Mr. *John Young*, of *Ruffle*, *Northumberland*; Mr. *James Wood*, of *Newcastle*; Mr. *Thomas Goodlad*, of *Cottingham*, near *Hull*; Mr. *George Grant*, Pupil to Mr. *Judson*, of *Beverley*; Mr. *Benjamin Tourton*, of *Kildesdon*, near *Derby*; Mr. *Alexander Rowe*, of *Cornwall*; and Mr. *Michael Taylor*, *Newcastle upon Tyne*. — Mr. *John Fryer*, Master of *Trinity-School*, *Newcastle*, and Mr. *W. Wells*, of *Crowle*, accurately answered it. Mr. *W. Pearson*, of *Northfields*; Mr. *John Curr*, of *Buckblades*, near *Newcastle*; and Mr. *John Milne*, of *Hexden-Pans*, *Northumberland*, answered it; as did Mr. *Coughron*, of *Newcastle*, in a curious Manner.

II. QUESTION 424, answered by Mr. Robinson, of Biddick.

AS 100 : 104.5 :: 1 : 1.045, the Amount of 1l. for a Year; and as 100 : 5 :: 650 : 32.5l. one Year's Interest. Let $x =$ the Years required.

Therefore $650 + 32.5x =$ Amount of Simple-Interest; $580 \times \overline{1.045}^x =$ the Amount of the Compound-Interest. Therefore, $580 \times \overline{1.045}^x - 650 + 32.5x = 600$, per Quest. Whence, $\overline{1.045}^x = \frac{1250 + 32.5x}{580}$; solved, $x = 30.8$ Years, required.

Mr. *G. Newland*, of *Newport*, puts $t =$ Time required; $a = 600$ l. Difference of Amounts; $s = 580$ l. P. 650l. R $= 1.045$, Amount of 1l. for a Year; $r = .05$, Rate at Simple-Interest. Then, by a known Theorem, we

have $sR^t - prt + p = a$. From whence, by Logarithms and the Method of Trial and Error, $t = 30.8062015$, &c. Years, confirming the Truth of Mr. *Robinson's* Solution, to greater Accuracy.

Mr. *Pen*, of *Chalfont*, answered it; as did Mr. *John Lowe*, of *Birmingham*; Mr. *J. Scot*, of *Cawthorne*; *Gemini*, of *Morpeth*; and Mr. *Dalton*, of *Pool*. Mr. *Young*, of *Ruffle*, gave a Theorem, but no Numbers. Mr. *Stephen Hartley* gives 30.816 Years; Mr. *James Wood*, of *Newcastle*, 30.809. Mr. *T. Goodlad*, of *Cottingham*, and Mr. *G. Grant*, Pupil to Mr. *Judson*, of *Beverly*, solved it. Mr. *G. Hicks*, of *Reedness* Free-School, elegantly: As did likewise Mr. *Alexander Rowe*, by Trial and Error. Mr. *Michael Taylor*, of *Marley-Hill*, near *Gibside*, near *Newcastle-upon-Tyne*, elegantly solved it. Mr. *John Fryer*, Master of *Trinity-School*, *Newcastle*; Mr. *W. Wells*, of *Crowle*, *Lincolnshire*; Mr. *John Curr*, of *Buckblades*, near *Newcastle*; and Mr. *W. Hardy*, Master of *Cottingham School*, answered it. Mr. *Coughron* puts $650 = a$; $.05 = b$; $580 = p$; $1.045 = r$; $600 = c$; and the required Time $= t$.

Then, by the Question and known Theorems, $pr^t - a + abt = c$; whence, by Trial and Error, $t = 30.81$ Years, very nearly.

III. QUESTION

III. QUESTION 425, answered by the Palladium-Author.

IT is evident that all the *Posts* and *Rails* should bear some certain *Ratio* to each other, in Order to determine the Loads in any Number of *Posts* and *Rails*, by the Load, or Loads, in any other Number of *Posts* and *Rails* given. Let every Post be to every Rail in Weight as 1 to x ; then $1P. : xR. :: 40P. : 40xR.$ And $1P. : xR. :: 700P. : 700xR.$ Now $40xR. + 100R. :$

$$1L. :: 700xR. + 2900R. : \frac{700x+2900}{40x+100} = \text{Loads required.}$$

When $x = 1$, (or 1 Post = 1 Rail,) then $\frac{700+2900}{40+100} = 25\frac{5}{7}$ Loads.

When $x = 2$, (1 Post = 2 Rails,) then $\frac{1400+2900}{80+100} = 23\frac{8}{9}$ Loads.

When $x = 3$, (1 Post = 3 Rails,) then $\frac{2100+2900}{120+100} = 22\frac{8}{11}$ Loads.

Had it been proposed, If 40 *Posts* and 100 *Rails* be 1 Load, how many Loads will 700 *Posts* and 1750 *Rails* (instead of 2900) make? it would have admitted an Answer; because the first *Posts* and *Rails* are in the same Proportion to one another as the second *Posts* and *Rails* given.

As 40 *Posts* to 100 *Rails*, so 700 *Posts* to 1750 *Rails*.

Now if $40P. + 100R. : 1L. :: 700P. + 1750 : \frac{700+1750}{40+100} = 17\frac{1}{2}$

Loads; and, universally, if a Post to a Rail be as 1 to x ; then $\frac{700x+1750}{40x+100} = 17\frac{1}{2}$ Loads, let x be what it will, or the Ratio of 1 Post to 1 Rail ever so various. Most of the Correspondents miscomprehended and wrong answered this Question, as widely as the Proposer misproposed it.

Mr. John Lynn, a Pitman, of Ruffe, Northumberland, judiciously puts m to 1, for the Ratio of a Post to a Rail. Then $m : 1 :: 40 : \frac{40}{m}$; and $m : 1 ::$

$$700 : \frac{700}{m}. \text{ Now } \frac{40}{m} + 100 = 1 \text{ Load. Hence } \frac{40}{m} + 100 : 1 :: \frac{700}{m}$$

$$+ 2900 : \frac{2900m+700}{100m+40} = \text{Loads required; answering the Conditions as above.}$$

This Mr. Lynn, though a Pitman, has performed more than many who live above Ground. Mr. Michael Taylor, of Marley-Hill, near Gibside, or near Newcastle on Tyne, proposed it with other Data. Mr. John Fryer, Master of Trinity School, Newcastle, answered it. Mr. John Cur, of Buckblades, observes, that the Number of *Posts*, and also of *Rails*, making a Load, should have been given. — Mr. Coughron judiciously observes, as the Question is stated, there will be $17\frac{1}{2}$ Loads, and 1150 *Rails* over; but for Want of the Ratio of a Rail to a Post the Loads in 1150 *Rails* cannot be determined. Had or, instead of and, been expressed in the Question, it had been limited, and the Answer had been $64\frac{1}{2}$ Loads. Thus Mistakes are improved to Advantage.

46 $\frac{1}{2}$

IV QUESTION 426, answered by Mr. Thomas Adcock, of Ashby de la Zouch.

FIRST, $9 \times 4.5 = 40.5$ Inches, the Area of one Brick. Then, $40.5 : 1 :: 1296$

THE BRITISH PALLADIUM, OR

∴ 1296 (Inches in one square Yard) : 32, the Bricks Content in one Yard.
Now, $8.476 \times 6.472 = 54.856672 \times 32 = 1755.41340$, &c. the Number of Bricks, required.

Mr. Robinson, of Biddick, gives $\frac{36 \times 16}{9 \times 4 \times 5} = 32$ Bricks to pave 1 square Yard.

Therefore, $8.476 \times 6.472 \times 32 = 1755.4135$ Bricks, required, as before.

Mr. W. Pen, of Cbalfont, gives $1755 \frac{6461}{155625}$, nearly.

Mr. John Lynn, Pitman, and Mr. George Hicks, of Reeds's Free-School, Yorkshire, give 1755.413504. Gemini, of Morpetb; Mr. John Sbadgell, of Ross, Herefordshire; Mr. James Muscroft, of Rotherham; Mr. John Skermer, of Abby de la Zouch; Mr. Dalton, of Pool; Mr. Stephen Hartley; Mr. James Wood, of Newcastle; Mr. William Turner, Writing-Master and Teacher of Mathematics in Whitney, Oxfordshire; and Mr. Thomas Goodlad, of Cottingham; answered it. Mr. George Grant, Pupil to Mr. Judson, of Beverly, answered it by the universal Rule of Proportion.

Mr. Benjamin Turton, Keldeston, Derby; Mr. Alexander Rowe, of Cornwall; Mr. John Fryer, of Trinity School, Newcastle; Mr. William Wells, of Croxale, Lincolnshire; Mr. William Pearson, of North-Shields; Mr. John Curr, of Bush-blades, near Newcastle upon Tyne; and Mr. John Milne, of Howden Pans, Northumberland; all correctly answered it, by accurate and short Methods.

Mr. Congbron, of Newcastle, also solved it by $8.476 \times 6.472 \div \frac{1}{3} \times \frac{1}{8} = 1755.413504$ Bricks, required,

V. QUESTION 427. answered by Mr. Robinson, of Biddick.

LET x = Years lived since 1750; y = those before; $x + y$ = his Age; $1750 - y$, the Date he was born; therefore, $51x + 51y = 1750 - y$, per

Quest. $y = \frac{1750 - 51x}{52}$; here x must be a whole Number, suppose 18; then

$y = 16$, and $x + y = 34$ Years of Age in 1768, being born in 1734; consequently, the Age will be 37 in 1771. W. W. R.

Mr. Judson, of Beverly, Yorkshire, says his Age is 34, by the Method given to the Solution of Question XII. P. 161 of the Royal Astronomer and Navigator.

Gemini, of Morpetb, answered it nearly in the same Manner. Mr. I. Scott, of Carwithorne, answered it; as did Mr. Thomas Adcock, of Abby de la Zouch; Mr. George Newlund, in the Isle of Wight; Mr. Charles Taylor, Pupil at Mr. Brownell's School, of Coventry; Mr. R. Dalton, of Pool; Mr. William Fox, of Cbalfont; and Mr. William Taylor, of Dodworth, near Barnsley, Yorkshire.

Mr. Charles Taylor, of Mr. Brownell's School, Coventry, answers it thus. — Let x = Number of Years before 1750, y = the Number of Years after 1750.

By Question, $x + y \times 51 = 1750 - x$; i. e. $51y = 1750 - 52x$; whence,

$y = \frac{1750 - 52x}{51} = 34 - x + \frac{16 - x}{51}$, a whole Number. Whence, $x =$

$16 - 51a$; from which Equation, a must be $= 0$; whence $x = 16$, and $y = 18$: Therefore, Mr. Wells was born in the Year 1734, and is 37 Years old in 1771.

Mr,

Mr. *Alexander Rowe* puts $2x =$ that Part of his Age in Years since 1750. Then, by Question, $51 \times 2x = 1750 + 1 - x$, or $102x = 1751 - x$; therefore, $103x = 1751$; whence $x = \frac{1751}{103} = 17$, and $2x = 34$; conse-

quently, $1771 - 1734 (= 1751 - 17) = 37$ Years, required.

Mr. *John Curr*, of *Busbblades, Newcastle*, answered it. As did Mr. *William Breefe*, an ingenious Pupil of Mr. *Sadler's*; Mr. *William Turner*, of *Watney, Oxfordshire*; Mr. *Thomas Goodlad*, of *Cottingham*; Mr. *George Grant*, Pupil to Mr. *Judson*; Mr. *Michael Taylor*, near *Newcastle*; Mr. *William Wills*, of *Crowle, Lincolnshire*.

Mr. *William Hardy*, of *Cottingham School*, says, this Question is similar to one in the *Royal Astronomer*, and finds the Age as above.

VI. QUESTION 428, answered by Mr. John Lowe, of Birmingham.

FROM the second Equation, $y = \sqrt{6836 - x^2}$; which substituted for y , in the first Equation, and solved, $x = 44$; thence $y = 70$, the two young Maidens Ages, required.

Mr. *I. Scott*, of *Cawthorne*, answered it; as did *Gemini*, of *Morpeth, Northumberland*, by giving an Equation of the 12th Power, and its several formidable Coefficients, and finding the Root $x = 44$, (a Herculean Labour!) the Age of one young Lady; whence the Age of the other is 70, required.

Mr. *Judson*, Teacher of the Mathematics and Writing Master at *Beverly School, Yorkshires*, finds $x = \sqrt{6836 - 70 \times 70} = 44$, from whence the other young Lady's Age = 70. Mr. *James Wood*, of *Newcastle*, also answered it.

Mr. *Robinson*, of *Biddick*, answers it thus.

$$\begin{array}{l} \text{Given} \\ \text{Equations} \end{array} \left\{ \begin{array}{l} x^2 + y^2 = 6936 - 100 = 6836 = b \\ \frac{x + x^2y + 12}{\sqrt{xy} + 56} = 2421 = c \end{array} \right\} \begin{array}{l} x = \text{Age?} \\ y = \text{Age?} \end{array}$$

$$y^2 = b - x^2; \text{ therefore, } y = \sqrt{b - x^2}.$$

$$\left. \begin{array}{l} \frac{x + \sqrt{bx^4 - x^6} + m}{\sqrt{d + \sqrt{bx^2 - x^4}}} = c \end{array} \right\} c^2 - m = n.$$

$$x + \sqrt{bx^4 - x^6} = \sqrt{c^2d + \sqrt{x^4bx^2 - c^4x^4} - m}.$$

$$\text{Put } p = \sqrt{4m^2c^2d}, \quad n - p = s.$$

$$\text{Then, } \sqrt{4bx^6 - 4x^8} + 4m^2\sqrt{c^4bx^2 - c^4x^4} = s - x^2 - bx^4 + x^6.$$

This Equation solved, by Trial, $x = 44$, $y = 70$, required.

Mr. *John Sbadgell*, (or *Sbadgett*), of *Ross*, solves it thus.

From the second given Equation take $x^2 + 100$, and the Remainder is $y^2 = 6836x^2$; then $y = \sqrt{6836 - x^2}$; which Value of y being substituted in the

$$\text{first Equation, it becomes, } \frac{x + x^2\sqrt{6836 - x^2} + 12}{x\sqrt{6836 - x^2} + 56} = 2421. \quad \text{From}$$

whence, by Trial and Error, $x = 44$; and, consequently, $y = 70$, the two Ages.

Mr.

Mr. James Mascroft, of Rotherham, brought out, *exactly*, the same Equation; whence $x = 44$, and $y = 70$. — Mr. John Lynn, Pitman, puts $2421 = a$; $6936 = t$; then, from the 2d Equation, we get, $y =$

$\sqrt{b - 100 - x^2}$ ($b = 3480$). This Value of y , substituted in the first Equation, gives $\frac{x + x^2 \sqrt{b - 100 - x^2} + 12^*}{x \sqrt{b - 44 - x^2}} = a = 2421$. (*Quere*) Reduced and solved, $x = 44$, $y = 70$. Q. E. F.

Mr. Thomas Adcock, of Ashby de la Zouch, answers it thus.

Nanny is Seventy, and no more;

Nelly indeed but Forty-four.

Mr. George Hicks, of Reeds Ness Free-School, Yorkshire, determines, by Trial and Error, that the Years Mr. Wells had lived since $1750 = 34$; consequently, $51 \times 34 = 1734$, the Date of his Birth; whence his Age, in 1771, $= 37$. W. W. R.

Mr. George Hicks, of Reeds Ness, finds the second Equation, $x^2 + y^2 = 6936 - 100 = 6836$; whence (by Trial and Error) he determines $x = 44$, and $y = 70$.

Mr. Stephen Hartley gave the same Answer, by a short Process. Mr. William Breefe solved it elegantly. Mr. Ez. Walker, of Burton on Trent, Staffordshire, curiously answered it, analytically, and then by Trial and Error. Mr. Alexander Rowe answered it by a final Equation, and Trial and Error. Mr. John Fryer, of Trinity School, Newcastle; Mr. John Curr, of Busbblades, Newcastle; and Mr. William Hardy, Master of Cottingham School, find the young Virgins Ages as above.

Mr. Coughbron, of Newcastle, puts $2431 = a$; $6836 = b$; then, from the second Equation, $y = \sqrt{b - x^2}$; which put for it in the first, $x + x^2 \sqrt{b - x^2} + 12 = a \times 56 + x \sqrt{b - x^2} \frac{1}{2}$; whence, $x = 44$, and $y = 70$, the required Ages.

VII. QUESTION 429, answered by Mr. Robinson, of Biddick.

THE Proposer does not shew how many solid Feet are contained in a Ton of Coals. With us, amongst Coalmines, it is computed, that a square Yard of Coal, or 27 solid Feet, will yield 8 Bolls of Coal Measure, which are sold for

5 Shillings. Put $x =$ Breadth; therefore, $x = \sqrt{\frac{50 \times 5}{27 \times 237.5}} = .4415$

Feet $= 5.298$ Inches.

Mr. John Lowe, of Bull-Ring, Birmingham, puts $x =$ specific Gravity of the Coal, which, by the *Philosophical Transactions*, Number 169, is 1240. Let $a =$ Length, $b =$ Depth, and $x =$ Breadth; then will $237.5x^3 =$

$\frac{sabx}{2240}$; therefore, $x = \sqrt[3]{\frac{sab}{237.5 \times 2240}}$.

N. B. The Rule for finding the Quantity of Tons of Coal in any Vein, (*Question 429*), is shewn in most Books of *Hydrostatics*, he says. This same Mr. Lowe tells us we spelt his Name *Yon*; but it was the Paper's being cut off by Scissars, when we received it, made it appear so: And oftentimes Correspondents seal their Letters so, over the Writing, as to hinder their being read.

Gemini, of Morpeth, Northumberland, answers it thus,

Put

Put $a = 50$; $b = 5$; $c = 237.5$; and $x =$ Breadth; also $d = 33.0479$:

Then, by Question, $\frac{abx}{d} = cx^3$; or $ab = dcx^2$: Therefore, $x = \sqrt{\frac{ab}{dc}} =$

.1784. Hence, the Content is 1.04698, and Price *per* Ton, 5s. 2d. $\frac{1}{4}$.

General Rule. Multiply the Length, Depth, and Breadth, in Feet, and divide by 33.0479, the Quotient will be the Tons in that Seam.

Mr. I. Scott, of *Cawthorne, Yorkshire*, puts $a = 500$, (and not 50, as *per Data* printed), $b = 5$, $c = 237.5$, and $x =$ Depth. Then, *per Quest.* abx

$= cx^3$; therefore $x = \frac{\sqrt{ab}}{c} = 3.2418$; and the Content of the whole Vein

$= 8104.5$. And, by specific Gravity, one Ton of Coals $= 28.5577$ cubic

Feet; whence $\frac{8104.5}{28.5577} = 283.7933$ Tons; which, at 5s *per* Ton, amount

to 70l. 19s. nearly.

Remark by Mr. Cawthorne.

I am of Opinion, that to give a *general Rule*, as was required by Mr. Dalton, is impossible; because the Miners, or Colliers, are obliged to leave a Quantity of Coals ungot, for what they call *Posts*, to support the Roof; and as some Roofs require to be more, and some *Posts* to be less, in Quantity, that are *ungot Coals* in different Veins.

In Mr. Dalton's last Answer he puts $x =$ Breadth, $a = 65$ lb. Avoirdup. in 1 cubic Foot of Coal; $b = 237\frac{1}{2}$; $m = 2240$ lb. in 1 Ton; $c = 50 \times 5 =$

250; therefore $\frac{acx}{m} = bx^3$; reduced, $x = 0.174777$; therefore $\frac{acx}{m} =$

1.268 Tons required; a *general Theorem*, which, at 5s. *per* T. $= 6s. 4d.$ W. W. R.

Mr. R. Judson, of *Beverley*, from Mr. Emerson's Tables of specific Gravities, by an easy Process, finds the Content $= 1.6858$ Tons, and the Value 8s. 5d. 15. W. W. R.

Mr. James Wood answered it, as did Mr. Alexander Rowe, with the Value of the Vein, 4s. 4d. 038; from which different Solutions there appears to be no *general Rule*, for the Reasons before assigned. Mr. Michael Taylor, near *Newcastle*, answered it, by the *general Rule* of the Product of the Length, Breadth, and Depth, (without Allowance for Columns or Waste,) by .07501676, for the Content in Tons. Mr. John Fryer, of *Trinity-School, Newcastle*; Mr. John Curr, of *Bushblades, Newcastle*; and Mr. W. Hardy, Master of *Cottingham-School*, answered it all differently; Mr. Coughron, of *Newcastle*, from Mr. Emerson's specific Gravities, of 78.12 lb. Avoird. to 1 cubic Foot of Coal, and 28.672 Feet in a Ton; putting $a = 50$; $b = 5$;

$c = 237.5$; $d = 28.672$; and $x =$ the required Breadth. By *Quest.* $\frac{abx}{d}$

$= cx^3$; therefore $x = \frac{\sqrt[3]{\frac{abd}{c}}}{c} = .191606$, &c. Feet; consequently, the Con-

tent in Tons $= 1.67067$; which, at 5s. each, is 1s. 4 $\frac{1}{4}$ d. nearly. — Rule. The Content of any Piece of Coals, in Feet, divided by 28.672, is the Content in Tons.

VIII. QUESTION 430, answered by Mr. Dalton, of Pool.

PUT $a = 3$ f. $b = 4$ f. $c = 105$ f. and $x =$ either Length or Breadth, and $y =$ the other of them. For a general Solution, $xy =$ Area; $ax + by = c$,

$= c$, the Money to be paid for that Area ; and $\frac{c - ax}{b} = y$; whence $xy =$

$$\frac{cx - ax^2}{b} = \text{a Maximum. In Fluxions, and reduced, } x = \frac{c}{2a} = \frac{171}{2},$$

and $y = 13\frac{1}{2}$; therefore $22.9\frac{11}{16} =$ the Number of Acres required.

Mr. G. Newland, of Newport, puts $x =$ the Length, and $y =$ the Breadth, in Chains ; then, per Quæst. $3x + 4y = 105 = a$; and $xy =$ Area, a Maxi-

mum. From the 1st Equation, $x = \frac{x - 4y}{3}$; which put in the 2d, and the

Expression resulting put into Fluxions, we have $ay - 8yy = 0$; whence $y =$

$$\frac{a}{8} = 13.125 \text{ Chains, the Breadth, and } x = 17.5 \text{ Chains, the Length.}$$

Mr. John Lynn, of Ruffe, Northumberland, solves it by a similar Method to Mr. Newland's ; bringing out exactly the same Number of Chains for Length and Breadth.

Mr. N. Brownell, Master of Coventry School, answers it by a like Method ; making the Length $= 17\frac{1}{2}$, and Breadth $= 13\frac{1}{2}$ Chains, the same as above.

Gemini, of Morpeth, accurately solved it ; as did Mr. John Lowe, of Birmingham ; Mr. Robinson, of Biddick ; Mr. T. Adcock, of Asby de la Zouch, Leicestershire ; Mr. J. Scot, of Carwtborne ; Mr. Stephen Hartley, of Sowerby-Bridge ; Mr. James Wood, of Newcastle ; Mr. G. Grant, Pupil to Mr. Judson ; Mr. G. Hicks, of Reedness Free-School ; and Mr. Alexander Rowe, who finds the Area 229.6875 square Chains, $= 22 \text{ A. } 3 \text{ R. } 35 \text{ Polcs.}$

Mr. Sadler says every square Chain costs 7 $\frac{1}{2}$ £. (because 1 in Length cost 3 $\frac{1}{2}$ £. and 1 in Breadth 4.) Therefore, as 7 : 1 square Chain :: 105 $\frac{1}{2}$ £. : 150 sq. Chains, the Land required. *A new Method of Solution.*

Mr. R. Judson, Teacher of Mathematics, and Writing-Master in Beverley School, says that this Question and Method of Solution may be seen in Fletcher's *Universal Measurer and Mechanic*, P. 123. Mr. Michael Taylor answers it exactly like Mr. Alexander Rowe's Numbers, confirming the same by a fluxional Method, like Mr. Dalton's. Mr. John Fryer, of Newcastle ; Mr. W. Wells, of Grevole, Lincolnshire ; and Mr. W. Pearson, of North-Sields, solved it elegantly. Mr. J. Curr, of Busbldes, Newcastle, and Mr. W. Hardy, of Cottingham, answered it ; as did Mr. W. Taylor, of Dodworth, near Barnsley, Yorkshire ; and Mr. John Miln, of Howden-Pass, Northumberland, exactly.

Mr Congbron put x and y for the Length and Breadth, respectively ; then $3x + 4y = 105$, or $4y = 105 - 3x$, and $4xy = 105x - x^2$, a Maximum.

In Fluxions, and reduced, $x = \frac{105}{6} = 17\frac{1}{2}$ Chains ; and $y = (= \frac{1}{4} \times$

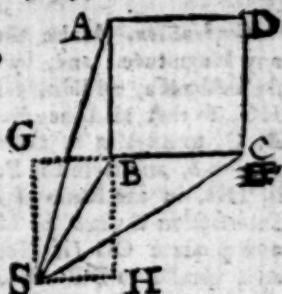
$$105 - x) = 13\frac{1}{2} ; \text{ therefore } xy = 22 \text{ A. } 3 \text{ R. } 35 \text{ P. required.}$$

IX. QUESTION 431, answered by Mr. Robinson,
of Biddick.

$$\text{PUT } \left. \begin{array}{l} c = SC \\ b = SB \\ a = SA \end{array} \right\} \text{ given.}$$

$$\left. \begin{array}{l} c^2 - b^2 = m \\ a^2 - b^2 = n \end{array} \right\}$$

and let $x = AB = BC$



$$\text{Ex. 2. 12. } \frac{n - x^2}{2x} = BG = SH$$

$$\text{And } \frac{n - x^2}{2x} = BH = GS$$

$$\text{Th. } \frac{n - x^2}{2x} + x = \frac{n + x^2}{2x} = AH$$

$$\text{E. 1. 47. } AH^2 + SH^2 = AS^2$$

$$\text{i.e. } \frac{n^2 + 2nx^2 + x^4 + m^2 - 2mx^2 + x^4}{4x^2} = a^2$$

$$2x^4 + 2n - 2m - 4a^2 \times x^2 = -x^2 + m^2$$

$$\text{or } x^4 + n - m - 2a^2 \times x^2 = -\frac{n^2 + m^2}{2}$$

a quadratic Equation, or general Rule, whence the Value of x may be easily determined. W. W. R.

Mr. John Lowe, of Birmingham, answered the same, by a quadratic Equation, but not quite so compendious as the Proposer's. Mr. R. Judson, of Beverly, elegantly answered it by a double Quadratic of the 4th Power; and remarks that it is similar to a Question proposed in the *Gentleman's Diary* for 1751 and 1752, though unknown to Mr. Hardy, as he declares; and that his own Solution is independent of any of the Solutions there given. Mr. Stephen Hartby says this Question is constructed in the *Gentleman's Diary*, p. 29, for 1751.

Mr. Alexander Rowe answers the Question thus.

LET P represent the Point given; AB (= BC, &c.)

a Side of the Square; let AP = a , Bb = b ; CP = c .

Now putting $a^2 - b^2 = d$; and $c^2 - b^2 = e$; then

$$\sqrt{\frac{e-d}{2}} = AB = 5.968668; \text{ whence } a = 13, b =$$

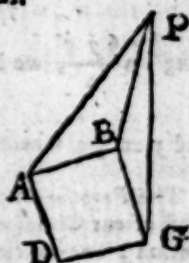
10, and $c = 15\frac{1}{2}$. The required general Rule is hence evident by Inspection.

N. B. This Problem is of Use in Surveying, when the Square cannot be otherwise found.

Mr. Thomas Sadler, of Whitcomb, Shropshire, puts $x = \frac{1}{2}$ the Diagonal of the Square; then, by 47 E. 1, $a^2 - x^2 + 2xb + b^2 = x^2$; therefore $2x^2$

$$+ 2xb = a^2 - b^2; \text{ consequently, } x = \sqrt{\frac{a^2 + b^2 + \frac{1}{4}b^2}{2}} - \frac{1}{2}b; \text{ whence}$$

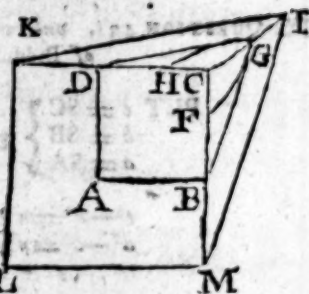
$$\sqrt{2x^2} = \text{Side of the Square.}$$



Mr. Michael Taylor answered it by a Quadratic: Mr. John Fryer, of Trinity School, Newcastle, solved it elegantly: Mr. John Curr, of Buckblades, Newcastle, answered it by drawing a Triangle round the Square, trigonometrically, demonstratively, and by Calculation.

Answered by Mr. Coughron.

Construction. Make the Square ABCD of any Magnitude; and, by Lem. p. 336, *Simpson's Algebra*, 2d Edit. describe the Arcs FG, HG, so that all Lines drawn from the Points B, C, to meet in F, G, may be in the Ratio of c to b , and from the Points D, C, to meet in HG, in the Ratio of a to b ; from their Interfection G draw the Lines BG, CG, DG, and produce CG (if Need be) till $CI = a$; and, parallel to DG, BG, draw IK, IM, and, parallel to AD and AB, KL, ML; then



CKLM will be the Square required. *Demonstration.* By Construction, $b : a :: CG : DG :: CI (= b) : IK$, by similar Triangles; whence $IK = a$; and $b : c :: CG : BG :: CI (= b) : IM$, therefore $IM = c$; also, as $CG : CD$ or $CB :: CI : CK$ or CM ; consequently, CKLM is a Square.

Corollary. When the 3 Points are given in Position, (let the Figure be what it will,) the Construction will be no Way different; except that the Triangle DCB, instead of a right Angle, must be made that to be inscribed by DC, BC.

X. QUESTION 432, answered by Mr. George Hicks, of Reedness Free-School, Yorkshire.

PUT $x =$ the Side of the Square, $y =$ Side of the Cube; then $\sqrt{2x^2} =$ the Diagonal of the Square, and $\sqrt{3y^2} =$ the Diagonal of the Cube; $x^2 =$ the Area of the Square, $y^3 =$ the Solidity of the Cube; also $x^2 = 2y^3$, and

$\sqrt{2x^2} - \sqrt{3y^2} =$ a Minimum, by Quest. and by Substitution, $\sqrt{4y^3} - \sqrt{3y^2} =$ a Minimum. In Fluxions, $\frac{12y^2\dot{y}}{2\sqrt{4y^3}} - \frac{6y\dot{y}}{2\sqrt{3y^2}} = 0$; and divi.

ding by $\frac{6y\dot{y}}{2}$, we have $\frac{2y}{\sqrt{4y^3}} - \frac{1}{\sqrt{3y^2}} = 0$. By Reduction, $3y = 1$,

and $y = \frac{1}{3}$; whence $x = \sqrt{\frac{2}{27}} = \frac{1}{3}\sqrt{\frac{2}{3}}$. W. W. R.

The Proposer determined y and x to be exactly the same Quantities; but most of our Correspondents were out in solving this easy Question by an Inattention; one making $y = \frac{1}{3}$; another $y = 3$, and $x = 5$, &c. Mr. Stephen Hartley accurately solved it, by a Method like Mr. Hicks's above, with the same Conclusions in Numbers.

Mr. R. Dalton solved it accurately, $y = \frac{1}{3}$, and $x = \sqrt{\frac{2}{27}} = 0.2722$.

One Correspondent, after deducing $\sqrt{2x^2} = \sqrt{3y^2}$ for the true Minimum, took $2x^2 - 3y^2$ for its Square, a Minimum, (which is $2x^2 + 3y^2 -$

$2\sqrt{6x^2y^2}$) substituting therein, and so miscarried. We hope to be excused for a Caution given, not mentioning Names. Had our mistaken Correspondent made his Substitution in the two Radicals, and put them in Fluxions, his Numbers had come out right. — Mr. Michael Taylor, near Newcastle, answered it accurately; as did Mr. John Fryer, of Trinity School, Newcastle. Mr. Judson,

of *Beverley* says this Question admits of both a Maximum and Minimum. He calls the Side of the Square x , the Side of the Cube y , then the Diagonal of the Square $= \sqrt{2} \times x$, and the Diagonal of the Cube $= \sqrt{3} \times y$; but $\sqrt{3} \times y - \sqrt{2} \times x$ is a Maximum. In Fluxions, $\sqrt{3} \times \dot{y} - \sqrt{2} \times \dot{x} = 0$; per Quest. $xx = 2y^3$, in Fluxions $2x\dot{x} = 6y^2\dot{y}$; therefore $x = \frac{3y^2\dot{y}}{\dot{x}}$;

this substituted in the Maximum above, we have $\sqrt{3} \times y = \sqrt{2} \times \frac{3y^2\dot{y}}{\dot{x}}$;

therefore $\sqrt{3} \times y = \sqrt{2} \times \frac{3y^2}{\dot{x}} \times \dot{y}$; whence $\sqrt{3} \times \sqrt{2} y^3 =$

$\sqrt{18} y^4$; consequently, $y = \frac{1}{2}$, and $x = \sqrt{\frac{27}{2}}$. But, for the Minimum,

we have $\sqrt{2} \times x = \sqrt{3} \times y$; therefore $x = \frac{\sqrt{3} y^3}{\sqrt{2}}$, and, from above, x^2

$= 2y^3$; therefore, $2y^3 = \frac{3y^3}{2}$; whence $y = \frac{1}{2}$, and $x = \sqrt{\frac{27}{2}} = \frac{1}{2}$

$\sqrt{\frac{3}{2}}$. W. W. R.

Mr. *James Wood*, of *Newcastle*, answered it. Mr. *John Fryer*, of *Trinity-School, Newcastle*; Mr. *W. Pearson*, of *Northfields*; and Mr. *John Curr*, of *Busbldes, Newcastle*, answered it. Mr. *Hardy*, of *Cuttingham School*, makes the DIAGONAL of the Square, or of the Cube, the greatest, and so makes both a Maximum and a Minimum. If x = the Side of the Square, whose Diagonal

$= x\sqrt{2}$; and y = the Side of the Cube, whose Diagonal $= y\sqrt{3}$. Whence

$xx = 2y^3$; and $x\sqrt{2} - y\sqrt{3} = m$, per Quest. In Fluxions and resolved, $y = \frac{1}{2}$, and $x = \frac{1}{2}$: Quere? Mr. *William Taylor*, of *Dodsworth, near Barnsley, Yorkshire*, answered it correctly by Fluxions; as did Mr. *John Milne*, of *Howden Pans, Northumberland*, concisely and correctly by Fluxions.

Mr. *Coughron*, of *Newcastle*, puts x = the Side of the Cube; its Diagonal,

$x\sqrt{3}$; and, by Quest. the Side of the Square $= 2^{\frac{1}{3}} x^{\frac{2}{3}}$; therefore its Dia-

gonal $= 2x^{\frac{2}{3}}$; whence, $x\sqrt{3} - 2x^{\frac{2}{3}} = a$ Maximum, and not a Minimum. In Fluxions, and reduced, $x = \frac{1}{3}$ = the Side of the Cube; and thence the

Side of the Square $(= 2^{\frac{1}{3}} x^{\frac{2}{3}}) = \frac{1}{3} \times \frac{2^{\frac{1}{3}}}{3} = \sqrt{\frac{2}{27}} = .27216527, \&c.$

like Mr. *Dalton's* Numbers.

XI. QUESTION 433, answered by Mr. Robinson, the Proposer.

PUT $z = x + y$, and $z = xp$; then, by Substitution, in the given Equations, New

$$\begin{aligned} \text{Old} \quad \left\{ \begin{aligned} x^3 &= x^3 + 3x^2y + 3xy^2 + y^3 \\ 2xz &= 2x^2y + 2xy^2 \end{aligned} \right\} \text{Equations.} \\ \text{New} \quad \left\{ \begin{aligned} x^3 &+ x^2y + xy^2 + y^3 = c, \end{aligned} \right\} \end{aligned}$$

Then,

Then, $x^3 = x^3y^3$; therefore $x^3 + x = b$. Here $x = xy = 105$,
Again, $a^3 - 210a = 6028$. Here $a = 22 = x + y$.

Also, $y = 22 - x = \frac{305}{x}$; therefore $22x - x^3 = 105$; hence $x = 15$, and

$y = 7$, required.

Mr. John Lowe (who is masterly in *Analytics*) puts $p = xy$; whence $p^3 + p = 3480$; whence $p = 15.129$. Again, $s = x + y$, and $r = x^2 + y^2$; then,

by Substitution, $\frac{s^2 - r}{2} = p = 15.129$, and $sr = x^3 + y^3 + x^2y + y^2x = 6028$.

By Reduction, $s^3 - 30.258s = 6028$.

Therefore, $s = 17.902$ or $= .817$ } Referred to Examination for the Truth.

Or, $y = .817$ or $= 17.902$ } PALLADIUM-AUTHOR.

Mr. Richard Judson, of Beverly, answered the same, by putting $xy = p$, and

$x + y = s$; from whence, $p^3 + p = b$; and $s^2 - 2p \times s = c$; and thence proposed to determine the Numbers. — Mr. Hariley, in the first Equation, makes $x^2y^3 + xy = 3480 = b$; whence he gets $xy = 15.1328 = a$, by solving it.

Then he puts $\frac{a}{y} = x$; which being put for x in the second Equation, he gets

$\frac{a}{y^3} + y^3 + \frac{a^2}{y} + \frac{a}{y} = 6028 = c$; which being reduced and solved, he

finds $y = .841999$, and $x = 17.97245$. W. W. R.

Mr. James Wood, of Newcastle, after the same Method, finds $x = 17.905$ and $y = .845$. — Mr. Thomas Sadler has brought out an Equation like Mr. Judson's; but refers it to others to take the Trouble to solve it.

Mr. Alexander Rowe, putting $b = 1157730$, instead of 3480 printed, (which Mr. Robinson, the Proposer, must probably help him to); also putting $xy = v$; and $x + y = u$; gets $v^3 + v = b$, from the 1st Equation; and $u^3 - 2vu$

$= c$, in the 2d; $v = \frac{u^3 - c}{2u}$, and $u^3 = \frac{u^3 - c}{2u}^3$, and substituting these

Values in the 1st, $\frac{u^3 - c}{2u}^3 + \frac{u^3 - c}{2u} = b = 1157730$; which, reduced

and brought into Numbers, gives $u^9 - 18084u^6 + 4u^3 + 99748512u^3 - 241122^2 = 219038133952$; solved, $u = 22$; whence $v = 105 = xy$, according to Mr. Robinson; whence $x = 15$, and $y = 7$, according to Mr. Robinson's Solution; whose Difference of Numbers from Mr. Judson's and other Correspondents hence appears to be not explained by Mr. Robinson. — Mr. Michael Taylor, near Newcastle, answered it analytically and accurately; as did Mr. John Fryer, of Trinity-School, Newcastle, who found $x = 17.905$, and $y = .845$; and observes, that Mr. Holliday, in his *Syntagma Mathematicum*, P. 73, has given this Question with its Solution. Mr. John Cunn, of Buckblades, Newcastle, determined, by an elegant Process, $x = 17.908609$, and $y = .844952$. Mr. W. Hardy, of Cottingham, elegantly solved it by a double cubic Equation. Mr. John Milne, from Holliday's *Syntagma*, answered it. Mr. Congbron, of New-

castle, from 1st, finds $xy^3 + xy = 3480$; whence $xy = 15.132$; and from the 2d, $x^3 + y^3 - 2xy \times x + y = x^3 + y^3 - 30.264 \times x + y = 6028$; where

where $x+y=18.75$; whence $xy=15.132$, $x=17.905$, and $y=.845$, supposing x greatest. W. W. R.

XII. QUESTION 434, answered by Mr. Robinson, of Biddick.

PUT $C=6$, the Circumference of the Globe; which Globe being equal to two-thirds of its circumscribing Cylinder, put $p=\frac{7}{22}$, $d=\frac{22}{7}$; therefore

Cp = the Diameter of the Globe, $\frac{C^2 p^2 d}{4}$ = the Area of the Cylinder's Base;

therefore $\frac{C^2 p^2 d}{4} \times \frac{2Cp}{3}$ = the Solidity of the Globe. But $pd=\frac{7}{22} \times \frac{22}{7}$

= 1. Hence we have $\frac{C^3}{6} \times p^2 = \frac{C^2}{6} \times \frac{7}{22} \times \frac{7}{22} = \frac{C^3}{6} \times \frac{49}{484}$;

Being a General Theorem for finding the Solidity of any Globe, without using either Diameter or Radius.

Again, as the Length of the Cylinder is given 9 Inches, the Altitude of the Conoid is 18; therefore, as $18 : \frac{25}{4} :: 9 : 3.125 \times 4 = 12.5$; whose Square

Root = 3.5355, the Cylinder's Diameter. W. W. R.

Answered by Mr. John Lynn, of Ruffe, Northumberland.

WHEN the Diameter of a Globe is = 1, the Periphery is 6 Times the Solidity. Hence this General Rule. *The Cube of the Periphery of any Globe, divided by 6 Times the Square of the Periphery of a Globe, whose Diameter is Unity,*

will be the Solidity of the said Globe. Therefore, $\frac{6^3}{6 \times 3.1416^2} = 3.6478$, the

Solidity of each Globe.

Let $10x$ and $5x$ represent the Diameters of the Conoid.

Then, as $5x : 10x :: 10x-9 : 20x-18$ = the Diameter of the Cylinder;

but $\frac{20x-18}{2} \times 9 \times .7854$ = a Maximum. Fluxed and reduced, $x=.953$; the Diameters of the Conoid, 9.5 and 4.75; the Diameter of the Cylinder = 1, and its Solidity = 7.0686, &c.

Mr. George Hicks, of Reedness Free-School, very artificially determined the Content of each Globe = 3.647592, referring to *Holiday's Gunnery*, P. 37. Who determined the Solidity of the Conoid = 785.40; and the Diameter of the greatest Cylinder; that can be inscribed therein, = 5, required.

Mr. Judson, of Beverly, determines the Content of each Globe thus; as

$3.14159265^3 : .5236 :: 6^3 : 3.64757$. Then he observes, that to find the greatest Cylinder that can be inscribed in a Conoid, is the same Thing as to find the greatest Parallelogram that can be inscribed in an Ellipsis, whose Diameters are as 10 to 5, or 2 to 1. Who, by the Method of Fluxions, determines the same to be 25.58 and 12.79; but this answers not the Conditions of the Cylinder of 9 Inches Altitude, inscribed in a Conoid, of Diameters (Transverse and Conjugate) as 2 to 1.

Mr. Alexander Rowe finds the Content of the 2 Globes as above; then puts $2a=9$ = Trans. $2b=4.5$ Inches = Conj. $2b$ = Cylinder's Height to be inscribed in the Conoid; $a-x$ = Distance from the End of the Cylinder to the End

End of the Conoid; then, by Curve's Property, gets an Expression of the Cylinder's Solidity; which being put in Fluxions and reduced; $x = \frac{1}{2}a = 2\frac{1}{2}$; $2x = 4\frac{1}{2}$, the Cylinder's Length; and its Content, 35.7847875 Inches, required.

Mr. Michael Taylor, near Newcastle, differs in Opinion, as to the Answer to this 12th Question, who says to find the Content of Globes or Circles, without the Diameter (virtually or in Effect) is impossible. If c be the Circumference of a Globe, $a = 3.141569$, &c. then $\frac{c^3}{6a^3}$ is the Content of the

Globe; which, when $c = 6$, is $\frac{36}{a^3} = 3.64818$. For the other Part of the

Question, or other Question, put $a =$ Cylinder's Height $= 9$, $x =$ Distance from the Vertex, $t =$ Transverse Axis. Then, by p. 354, Hutton's Mensuration, As 10 : 5 or 2 : 1 :: $\sqrt{tx+xx} : \frac{1}{2}\sqrt{tx+xx} =$ the Radius of the

Cylinder's Diameter. Whence, $.7854a \times tx+xx =$ the Solidity of the Cylinder, which has neither Maximum nor Minimum; for it will increase or decrease infinitely, as x decreases or increases.

Mr. Hardy, of Cottingham, makes the Solidity as above, and finds the Solidity of a Cylinder, whose Length is 9 Inches, and Diameter $4\frac{1}{2}$ Inches; who remarks on the Insufficiency of the Question.

Mr. Coughron judiciously finds the Content of each required Globe 3.6475627, &c. Inches, nearly as above by Mr. Judson, and correcting the 2d Part of the Question, neither Conoid nor Spheroid admitting an inscribed Cylinder to be a Maximum.

To find the Solidity of a Cylinder 9 Inches Altitude, inscribed in a Spheroid, whose Transverse and Conjugate, being as 2 to 1, shall be the greatest. — The Solution follows. It is known the greatest Cylinder inscribed in any Curve concave to its Axis, is that whose Altitude $=$ Half the Subtangent at the Point of Contact. Whence, if $a = 4.5$, and $x =$ one of the Semidiameters of the

Spheroid, then will the Subtangent $= \frac{x^2 - a^2}{a} = 2a$, and $x = a\sqrt{3}$;

whence the Cylinder's Content, where the Spheroid is a prolate one, $= 3.1416a^3 = 286.2783$ Inches; and, when an oblate one, $= 16 \times 3.1416a^3 = 4580.4528$ Inches.

XIII. QUESTION 435, answered by Mr. James Muscroft, of Rotherham.

FROM the 1st Equation, $y^{\frac{2}{3}} = x^{\frac{1}{3}}$, $y^{\frac{4}{3}} = x$, $y^{\frac{8}{3}} = x^2$, $y^4 = x^3$; which respective Values, substituted in the 2d Equation, give $\frac{3y^2 - 2y^2}{3y} = y^{\frac{2}{3}} = \frac{y^2}{3y}$;

from whence $y^6 = 27y^3$, and thence, $y = 27$, and $x = 81$. W. W. R.

Mr. William Taylor, of Dodsworth, near Barnsley, Yorkshire, answered it.

Mr. Coughron, multiplying the 1st Equation by \sqrt{x} , gets $y^{\frac{2}{3}} + x^{\frac{1}{3}} = x^{\frac{1}{3}} + x^{\frac{1}{3}}$, or $y^{\frac{2}{3}} = x^{\frac{1}{3}}$; and, exterminating y , x by this Value makes the 2d Equation, $3y^2 - 2y^2 = 3y^{\frac{5}{3}}$; therefore $y = 27$, and $x (= y^{\frac{4}{3}}) = 81$, required.

The

The same was correctly answered by Mr. Robinson, of Biddick; Mr. John Lynn, of Ruffa; and Mr. Brownell, Master of Coventry School.

Gemini, of Morpeth; Mr. T. Adcock, of Ashby de la Zouch; and Mr. Shadgett, (or Shadgell,) of Ross, Herefordshire, answered it thus.

The two given Equations, when brought out of Fractions, are $3\sqrt{y^2} = \sqrt{x}$, and $3\sqrt{x^3} - 2xy^2 = 3y\sqrt{x}$. By the former, $y^2 = \sqrt{x^3}$, whence the latter, by Substitution, becomes $y^2 = 3y \times \sqrt{y^2}$; this Equation, reduced, gives $y = 27$, and $x = 81$.

Mr. Stephen Hartley answered it; as also Mr. James Wood, of Newcastle; Mr. Michael Taylor, near Newcastle; Mr. John Fryer, of Trinity School, Newcastle; Mr. John Curr, of Buckblades. Mr. Hardy, of Cottingham, does not pretend to solve it by a simple Equation; who says, *he that bides, can find*. Mr. Alexander Rowe, by putting $y = v^3$, and $x = u^3$, and writing their Va-

lues in the given Equations, and substituting for u in the 2d, gets $\frac{3v^6 - 2v^6}{3v^3} = v^2$; whence $3v^6 - 2v^6 = 3v^5$. $\therefore 3v - 2v = 3 = v$, and $u = 9$; whence $x = 81$, and $y = 27$.

XIV. QUESTION 436, answered by Mr. Coughron.

PUT $a = S$. Alt. at $6 = 17^\circ 4' 15''$; S and $C =$ Sine and Cos. 28° , Half the Merid. Alt. s and $c =$ Sine and Cos. $\frac{1}{2}$ Dif. of Co-Lat. and Declinat. then $Cr - Sr = S$. Lat. $Sc - Cs =$ Sine Decl. By Spherics, Rad. (1) :

$Cr - Sr :: Sc - Cs : a = Cr - Sr \times Sc - Cs = SC - sr$. Therefore $sr (=$ Sine Dif. Co-Lat. and Declinat.) $= 2Sr - 2a =$ Sine 14° ; \therefore the Latitude is 55° , and Declination 21° , answering to July 18, required.

Corollary. Hence it appears that the Sine of the Difference between the Co-Lat. and Declinat. is equal to the Sine of the Meridian Altitude, less twice the Alt. at 6. Rem. A curious Proposition, worthy the judicious Inventor.

Mr. Scott, of Carthorpe, Mr. Robinson, and Mr. Lowe, of Birmingham, answered it; analytically. Mr. Judson, of Beverly, solved it by Trial and Error, or the Rule of False; first supposing the Sun's Declination 23° , where the Error comes out $8^\circ 17' 51''$ too much; then he supposes the Declination 20° , and finds the Error $5^\circ 7' 38''$ too little: Whence, by the said Rule, and another Supposition, he finds the Latitude 55° , and Declination 21° .

N. B. He gets the Error, from considering the Sum of the Complement of Latitude and the Sun's Declination $= 90$, as they should be.

It was answered by Mr. Stephen Hartley; Mr. James Wood, of Newcastle, from Mr. Emerson's Prob. 155, p. 444; Mr. Alexander Rowe; Mr. Michael Taylor; Mr. John Fryer, of Trinity School, Newcastle, from the Method at p. 444, Emerson's Algebra; Mr. W. Pearson, of North-Shields; Mr. John Curr, of Buckblades; Mr. W. Hardy, of Cottingham; and Mr. Taylor, of Dodsworth.

XV. QUESTION 437, answered by Mr. Robinson, of Biddick.

$33 - 1 = 32$; which multiplied by $3 = 96 = 2c$, the Number of Feet in each Rank; $b = 40 \times 3 = 120 = EH$; $x = AH = IB$; and $c + x =$

AG. As $x : b :: c + x : \frac{bc + bx}{x} = GH$; \therefore

$$\frac{bc + bx}{x} \times c + x = \frac{bx^2 + 2bcx + bx^2}{x} = \text{the Area}$$

of the Triangle AH . . .

In Fluxions, $2bcx + 2b^2x^2 - bc^2 - 2bcx - bx^2 = 0$. Hence, $x^2 = c^2$, and $x = c = 48$; $CD = 120$ Feet, the *Timist* must stand from the first Rank, required.

Practical Solution, by Mr. George Grant, Pupil to Mr. Judson, of Beverly. Let the *Timist* march in the Front-Line, till he can just see the Left-Hand Man of the Rear-Rank past the Right-Hand Man of the Center-Rank; then let him advance obliquely to the Front, keeping these two Men in a Line with himself; then, in any Part of that Line, after he leaves the Front-Line, every Man may see him, when advanced about 200 Paces, from the Front-Line, he will have the Perspective View required.

Mr. Coughron, of Newcastle, observes, that if right Lines be supposed to pass through every 2 and 3 Men, the *Timist*, in any Point or Place, not situate in any one of these Lines, will be seen by all the Men; and that the 3 Ranks will also appear to him in a right Line, is evident from the Principles of Perspective. But since an infinite Number of such Points may be taken, it follows that the Problem is unlimited.

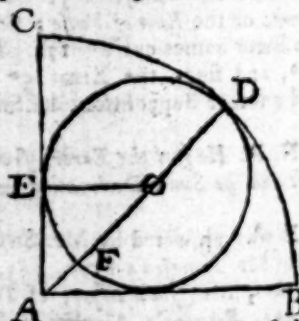
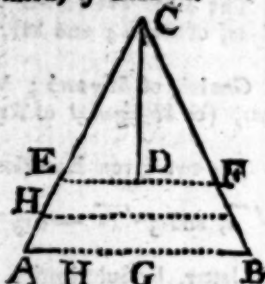
XVI. QUESTION 438, answered by Mr. Judson, of Beverly, the Proposer.

FROM the Nature of a Sphere, and of a Cube, it is easily proved that the Diameters of the 6 larger Balls are equal to the Diameter of a Circle inscribed in a Quadrant, whose Radius is equal to the Radius of the Shell, which will be found by a short Process = 4.141; whence 8.282 will be the Diameters of each of the 6 larger Balls. Now the Diameters of the 8 small ones (not 6, as printed) is found as follows.

By a known Theorem, As $1 : 2.1547 :: 8.282$ (Diameter of 1 of the larger Globes) : 17.846, the Diameter of a Circle circumscribing any 2 Globes, touching each other, whose Section passes through the Centers of each Globe. Therefore, in Fig. 20, let $OB =$ the Diameter of that Circle = 8.923; $DC = 10$; $EB, 4.142 = c$; $OE = 8.923 - 4.142 = 4.781 = b$; call the Semi-Diameter of the smaller Globe $CF = x$; then $DF = 10 - x$; $EF = x + c$; $DE = 10 - 4.142 = 5.857$;

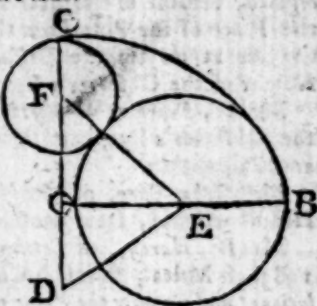
and $OD = \sqrt{DE^2 - OE^2} = 3.3$; therefore $OC = 10 - 3.3 = 6.6 = a$; then $FO = a - x$: But $FE^2 = OE^2 + OF^2$; therefore $c^2 + 2cx + x^2 = a^2 - 2ax + x^2 + b^2$; reduced, $x = \frac{a^2 + b^2 - c^2}{2a + 2c} = 2.3178$; therefore the Diameter of each of the

8 smaller Balls = 4.6356. W. W. R.



Mr. Alexander Rowe answers thus.

PUT x = the Diameter of each 6 of the largest Balls ; then $\sqrt[3]{x \times x \times x \times 6} = 20$; therefore $6x^3 = 20^3$; whence $x = \frac{20^3}{6} = 11.006$ Inches. Moreover, $20 \times 2 \div \frac{11.006 + 6}{2} = 4.7042$ Inches = the Diameters of the lesser Balls.—Others differ from the Proposer.



Mr. W. Hardy, of Cottingham, gives $\sqrt{\frac{D}{2+1}} = d, = \frac{20}{4\sqrt{2}}$ equal to

2.284270 = the Diameter of each of the 6 equal Globes. And, by his Method of solving *Quest. 24, Palladium* 1769, respecting the Bushel and Globe, he finds the Diameter of one of the 8 lesser Globes = 4.639871.

Mr. Cougbron observes that the Balls will be the greatest when each touches in the internal Surface of the Shell, and 3 of the rest ; therefore it will appear that Planes, passing through every 3 Points of the Shell where the Balls touch it, will form an *Octaedron* ; Whence, by an elegant Process, he determines 3.284271, &c. Inches = the Diameter of each of the 6 greater Balls ; 4.782926 = the Radius of the Circle passing through the Center of 3 Balls ; 6.617960, &c. = the nearest Distance of the said Circle from the Shell ; and 3.518841, &c. Inches = the Diameter of each of the lesser Balls.

Mr. Robinson, of Biddick, says the Bomb-Shell will contain 7 equal Balls ; who puts $b = 10$, Semidiameters, and x = the Radius of one of the Balls ;

then, by an analytical Process, he determines $x = \frac{b}{3} = 3.3333$, &c. $\times 2 = 6.6666$, the Diameter of the 7 equal Balls. Whence he determines the Diameter of the lesser Balls, required : But his Scheme, or Figure, is too large for Insertion, and excludes his full Answer.

XVII. QUESTION 439, answered by Mr. Judson, of Beverly.

LET P be the North Pole, and EB the Measure of the Latitude ; and let $r = 3932$ Miles, the Earth's Semidiameter ; c = Sine Comp. Lat. then it is evident, by the Figure, when $r = 1$, that $CB = EF$



$= 1 - c$; therefore $1 - c \times r$ (.398185 \times 3282) = 1565.66 Miles, the nearest Distance, required.— Draw BG perpendicular to BD ; then because of the Right-Angle GBD , the Angle $GBC = ADE$; consequently he must be carried in an Angle with the Horizon, equal to the Complement of the Latitude, to see the South Pole, or a Star in the Place thereof. W. W. R.

Mr. T. Goodlad, of Cottingham, determined the Distance to be 1592.6 Miles from the Earth, where the South Pole could be seen.

Mr. Alexander Rowe finds it different. *Mr. Sadler* proposes to determine the Distance by multiplying .66164 into the Earth's Radius,

Mr. Michael Taylor, near Newcastle, makes the Distance of the Person from the Earth to be 62032.5836 Miles.

Mr. John Fryer, of Trinity School, Newcastle, supposing this Question ambiguous, because of the Star's being at an infinite Distance, and no Distance of the Place of the Pole from the Earth given. According to the Supposition of the Star at an infinite Distance from the Earth, he determines the required Height of the Observer's Eye from the Earth to be 2633 Miles.

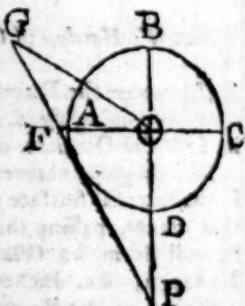
Mr. W. Pearson, of North Shields, supposing as above, makes the Height of the Observer's Eye from the Earth equal to 2697, by a trigonometrical Process and Calculation.

Mr. John Curr, of Buckblades, Newcastle, gives 2567.732, &c. Miles the Height required, from considering the Pole nearer the Earth.

Mr. W. Hardy, of Cottingham, determines the Distance from the Earth 1583.58 Miles; so much Correspondents differ; who must re-examine their Solutions, and compare the Principles they proceed on, to find out the Truth.

Mr. Coughron's Solution.

LET ABCD represent a Meridian Circle of the Earth, P the South Pole Star, and E the Place in Lat. 53° North. Now if the Line PFG be drawn to touch ABCD, and meet OE, produced in G, it is evident that a Spectator at G may see P; but as P is at such an immense Distance from D, that PG may be justly taken as parallel to the Earth's Axis BD, \therefore OF will be $=$ OA, and therefore the Angle OFG is a right Angle. Whence, as the Sine OGF (Comp. Lat.) : OF :: Radius (1) : OG. That is, in Words, as the Sine Complement of the given Latitude is to the Radius, or as Radius is to Secant of Latitude, so is the Earth's Radius to the required Distance from the Earth's Center $=$ 2636 $\frac{1}{2}$ Miles, (supposing the Earth's Radius 3985 Miles.)



XVIII. QUESTION 440, answered by Mr. Brownell, of Coventry-School.

PUT x = Length in Feet, y = Breadth, and z = Depth; then, by Quest. $xyz = 99$ Feet, and $x + 2y + 3z$ a Maximum. In Fluxions, $x + 2y + 3z = 0$; the first Equation in Fluxions is $xyz + xyz + xyz = 0$;

from which $\dot{x} = \frac{-xyz - x\dot{y}z}{yz}$; which put for \dot{x} in the 2d Equation, we have

$2y\dot{y}z - x\dot{y}z = 0$; whence $x = 2y$, and $3yz\dot{z} - x\dot{y}z = 0$; whence $x =$

$3z$; then $x \times \frac{x}{2} \times \frac{x}{3} = 99$; that is, $x^3 = 594$; and $x = \sqrt[3]{594}$, $y =$

$\frac{\sqrt[3]{594}}{2}$, $z = \frac{\sqrt[3]{594}}{3}$, and its Value $\sqrt[3]{594} \times 3$, in Shillings, which is a Mi-

nimum, (instead of a Maximum,) viz. 25.21835 Shillings $=$ 1l. 5s. 2d. 2.48q. required.

Mr. R. Dalton, of Pool, found the Cystern's Value 2l. 5s. 2 $\frac{1}{2}$ d. by the Method of Fluxions. Mr. John Lowe, Master of Birmingham School, and Mr. Robinson, answered it by a similar Method; as did Mr. George Hicks.

Mr. R. Judson finds the Length 8.406, Breadth 4.2030, Depth 2.802, and Value 25.218s. $=$ 1l. 5s. 2d. 2.46q. Mr. Stephen Hartley answered it; as did Mr. James Wood, of Newcastle; Mr. Alexander Rowe, of Reginnis, Cornwall; Mr. Michael Taylor, of Marley-Hill, near Newcastle; Mr. John Fryer, of Trinity School, Newcastle, (who observes, that the Length, Breadth, and Depth of any rectangular Solid, sold at different Prices, and the whole, for the least Money, that

that the Ratio of the Sides will be reciprocally as the Prices.) Mr. W. Pearson, of North-Shields; and Mr. W. Hardy, of Coltingham, solved it.

Mr. W. Dodsworth, near Barnsley, observes, from Experience, that a Rope-Dancer, or a Dancing-Master, is better rewarded than a Mathematician, or a Poet.

Remark by the Palladium-Author. It is evident that the foregoing Question admits of no Maximum; because then the greatest Depth in Feet may be infinite, or indefinite, at 3s. each, and the Length and Breadth exceedingly small, or each nearly equal to 0; so as to make a Content of 99 Feet: Whereas, in the Minimum, all the Products of the Length, Breadth, and Depth, in Feet,

(at 1, 2, at 3 Shill. each,) must be equal, or alike. Hence $x = \sqrt[3]{6 \times 99}$

$$= 8.406116; y = \frac{\sqrt[3]{6 \times 99}}{2} = 4.203058; \text{ and } z = \frac{\sqrt[3]{6 \times 99}}{3}, \text{ equal to}$$

2.802038; which, multiplied into 1, 2, 3, respectively, make $\sqrt[3]{6 \times 99} \times 3$, or three equal Products, whose Sum = 25.218348 Shillings, required.

Mr. Coughron, of Newcastle, puts a, b, c , and d , for 1, 2, 3, and 99; and x and y for the Length and Breadth: Then will $\frac{d}{xy}$ be the Depth, and $ax +$

$by + \frac{cd}{xy}$ a Minimum, (not a Maximum.) In Fluxions, $ax - \frac{cdx}{x^2y} = 0$, by

$- \frac{cdy}{xy^2} = 0$. Therefore $cd = ax^2y = by^2 = cxy^2 = cxyz$; or, by di-

viding by xy , $ax = by = cx$; consequently $xyz = \frac{a^2x^3}{bc} = d$; whence $x =$

$\sqrt[3]{\frac{a^2d}{bc}} = 8.40612$, $y = 4.20306$, and $z = 2.80204$, &c. Feet, and the required Value = 11, 5s. 2d, 2.48q. &c.

In this Manner may all such Questions be solved universally, let the Number of Quantities be what it will. When their continual Products are given, and the Sum of their Rectangles, when each is multiplied into a given Factor, for a Minimum, the required Numbers will be to one another in the reciprocal Ratio of their Factors.

XIX. QUESTION 441, answered by Mr. Coughron, of Newcastle.

LET O represent the Vertex of the Dish-Cover, and OABCDE its Form, when delineated in Plano. Put the Transverse = 16 = $2a$; the Conjugate = 12 = $2b$; the Height = 6 = c ; the Distance from the Center of any Ordinate rightly applied = x ; OB, or the Length of a Line drawn from the Vertex of the Curve to that Point in the Periphery where the said Ordinate cuts it = y ; and AB, or the Length of the Arc of the Ellipsis, comprehended between the Transverse and said Ordinate, = z ; Then, by the Prop. of the Ellipsis, &c.



&c. we find $y^2 = b^2 + c^2 + \frac{a^2 - b^2}{a^2} \times x^2 = d^2 + ex^2$, (by putting $b^2 +$

$c^2 = d^2$, and $\frac{a^2 - b^2}{a^2} = e$;) therefore $x = \frac{y^2 - d^2}{e}^{\frac{1}{2}}$, which, wrote for it

in the Series expressing the Value of z , gives the Relation of y and z ; from whence the Relation of the Abscissa and Ordinate, AF, BF, &c. and other Properties of the Curve, may be determined; but none of them (I apprehend) simple enough for being of Use to the *practical Brazier*.

Mr. Judson sent us a Solution, with 3 Figures, (which would cost 6s. the cutting,) exhibiting the Properties of the elliptical Cover in *Plans* from the Properties of the Ellipsis; whose Semi-Transverse he determines = 9.064; and 4.735 = the Semi-Conjugate. From whence he gives (what he calls) a *practical Solution*, by Points delineated, and drawing Lines, in a prolix Way, so as to mark out the Boundary of the required Curve, by Points; but not sufficient (as we apprehend) to answer the *practical Tinner's* or *Brazier's* Purposes; nor to answer the Expence of paying for 3 Cuts; whereas one Cut had been Expence enough for such a Purpose.

XX. QUESTION 442, answered by Mr. N. Brownell, of Coventry School.

PUT $Z = \text{Hyp. Log. } x$, $B = \text{Hyp. Log. } a$; then, the given exponential

Equation will be $3xZ = \frac{By}{x}$, i. e. $3x^2Z = By$; whence $y = \frac{3x^2Z}{B}$, and

$y\dot{x} = \frac{3x^2\dot{x}Z}{B}$ = the Fluxion of the Area; whose Fluent (by *Emerson's Flux-*

ions) is $Z - \frac{1}{3} \times \frac{x^3}{B}$ = Area, required,

Mr. Robinson, of Biddick, and Mr. Rowe, the Proposer, answered it. As did Mr. John Curr, of Buckblades, and Mr. William Hardy, of Cottingham.

Mr. Coughbron puts c and x for the hyper. Logarithms of a and x , respective-

ly; then will $3xx = cx^{-1}y$, and therefore, $y\dot{x} = 3c^{-1}x^2\dot{x}$; whose

Fluent (by *Emerson's Fluxions*) is $c^{-1}x^3x - \frac{1}{3}c^{-1}x^3 = x - \frac{1}{3} \times \frac{x^3}{c}$.

XXI. QUESTION 443, answered by Mr. Stephen Hartley, the Proposer.

PUT x = the Hypothenuse, x and y the Sine and Cosine of the Angle at Perpendicular, and Radius = 1. By Trigonometry, xx = the Base; and xy = the Perpendicular. By Question, $xy + xx = x^2x^2$, and $xx - xy = x^2y^2$; their Sum = $2xx = x^2 \times x^2 + y^2$, or $2xx = x^2$, (because $x^2 + y^2 = 1$); therefore $x = 2x$. Q. E. D.

Mr. Alexander Rowe's Answer.

LET nat. S. \angle at Base = a , S. \angle at Perp. = $\sqrt{1 - a^2}$, and Hyp. = $2a$: By Trig. As 1 (Radius) : $2a :: a$: Perp. = $2a^2$; and, as 1 : $2a ::$

$\sqrt{1 - a^2}$: Base = $2a\sqrt{1 - a^2}$; whence, by Question, $2a^2 + 2a\sqrt{1 - a^2}$

= $4a^4$; and $2a^2 - 2a^2\sqrt{1 - a^2} = 4a^2 - 4a^4$; add these Equations together, and $4a^2 = 4a^2$ = the Hypothenuse squared, by 47. E. I. Consc-
quently,

quently, $\sqrt{4a^2} = \text{Hyp.} = 2a$. Q. E. D. N. B. This dependant Equation proves Nothing.

Mr. Coughron thus proves this Proposition not to be true universally. — Put $x = S$, of the greatest acute Angle; then, if the Hypothefuse $= 2x$, the greater Leg $= 2x^2$, and the lesser Leg $= 2x\sqrt{1-x^2}$; therefore, according to the Theorem, $2x^2 + 2x\sqrt{1-x^2} = 4x^2$, and $2x^2 - 2x\sqrt{1-x^2} = 4x^2 - 4x^2$. This last Equation reduces to the former, being dependant Equations, or the same.

XXII. QUESTION 444, answered by Mr. Coughron.

THE Square Root of the centrifugal Force is as the Cosine of the Latitude, and in the same Circle or Latitude as the Time of Revolution, *inversely*; whence if the Gravity be supposed $= 289$, the centrifugal Force in the given Latitude

will be $=$ the Square of its Cosine; therefore, as $\sqrt{289} = 17$: Cos. $50^\circ 40'$ of given Lat. 11 : $23^h 56^m$, the Time of the Earth's Revolution : the required Time, when the centrifugal Force is $=$ Gravity, or the Castle began to tumble upwards, $= 53^m 32^s .4$.

COROLLARY. The Times of Revolution, when the centrifugal Force is $=$ the Gravity, are directly as the Cosines of the Latitudes; and therefore the Times of Revolution, in the foregoing Circumstance, may be found, by multiplying the Time when it happens at the Equator by the Cosine of the Latitude.

Mr. Lowe and Mr. Judson answered this Question. Mr. Hardy says, that this Question is universally answered in Fletcher's Navigation.

XXIII. QUESTION 445, answered by Mr. George Newland, the Proposer.

PUT $x =$ the Depth of the Well, $a = 16 \frac{1}{12}$ Feet, the Space descended in 1 Second, $b = 1142$ Feet, Motion of Sound in 1 Second, and $t = 3.75 =$ Time of Falling and of Sound ascending. As $\sqrt{a} : 1 :: \sqrt{x} : \sqrt{\frac{x}{a}}$ Sec.
 $=$ Time of Descent. And $b : 1^s :: x : \frac{x}{b} =$ Time the Sound ascended.

Then, by Laws of Motion and Gravity, $\sqrt{\frac{x}{a}} + \frac{x}{b} = t$; whence $x =$
 $\sqrt{b^2 - \frac{b^2}{4a^2}} - \frac{b}{2a} = 205.03 \text{ Feet} = 68.34 \text{ Yards, required.}$

Mr. Coughron answered it, by a correct Process, $= 205$, &c. Feet.

Mr. Dalton puts $x =$ the Well's Depth; therefore, $\sqrt{16} : 1^s :: \sqrt{x} : \frac{1}{4}$
 $\sqrt{x} =$ Seconds of Time of the Pin's Descent; and $1142 \text{ Feet} = a : 1^s ::$
 $x : \frac{x}{a} =$ Seconds of Time of the Ascent of the Sound; now $\frac{x}{a} + \frac{1}{4} \sqrt{x}$
 $= 3\frac{3}{4}$; reduced and solved, $x = 204.0671 \text{ Feet, required.}$ Mr. Scott finds $205.0321 \text{ Feet for Answer.}$ Mr. Pen, by a similar Method, finds the Drpth of the

the Well = 205,033 Feet. Mr. Hartley, also finds it much the same by a short Process.

Mr. George Eyre, Pupil in Mr. N. Brownell's School, and Mr. James Wood, answered it. Mr. Turner answered it from P. 258, Book IV. of *Saunderson's Algebra*, Quarto. Mr. Goodlad; Mr. George Grant, Pupil in Mr. Judson's School; Mr. Alex. Rowe; Mr. Michael Taylor; and Mr. Curr, answered it.

Mr. Hardy says this Question is similar to one in the *Ladies Diary*, concerning Eldon-Hole, in Warwickshire; [as it is similar to many others.] Mr. John Milne answered it from *Fletcher's universal Measurer*.

Though this Question is objected to, as not an Original, yet the Well it measures is a curious and an original Circumstance.

XXIV. QUESTION 446, answered by Mr. George Coughron.

CONSTRUCTION. Make $AD = 15$ and $2 \cdot 3ds$ and erect CD perpendicular thereto; from A to DC apply $AB = 360\frac{1}{2}$, and make $CB = 199\frac{1}{2}$; then a Circle, described through the 3 Points, A, B, C , will evidently be that on which the 3 Obelisks are erected.

Calculation. Draw the Diameter AOE , also AC , BE ; then will the $\angle ACB, AEB$, be equal, *Euc.* 30. 3. And therefore, the right-angled $\triangle ACD, AEB$, will be similar. Whence, $AD : AC :: AB$

$AE = \frac{AB \times AC}{AD}$; but $DB = \sqrt{AB^2 - AD^2} = 359.9925926$, &c. and

$AC = \sqrt{AD^2 + DC^2} = 559.9617972$, &c. Therefore, $AE = 12879.1213$ Feet = 2 Miles, 3 Furlongs, 113 Yards, 0.1213 Feet, required.

The same answered by Mr. Robinson, of Biddick.

$AB = 360.33$ Feet, $BC = 199.75$, $AD = 15.66$; 47. *Euc.* 1,

$\sqrt{AB^2 - AD^2} = BD = 359.988$; $BC + BD = DC = 559.738$. Then,

$\sqrt{DC^2 + AD^2} = AC = 559.957$. By similar Triangles, as $DC : AD ::$

$EC = \frac{1}{2} BC : BE = 5,586$. Hence, $\frac{AB \times BC}{BE} = 12886.845$ Feet, the Circle's

Diameter, required.

Mr. Scott finds the Circle's Diameter 12884.25 Feet, required.

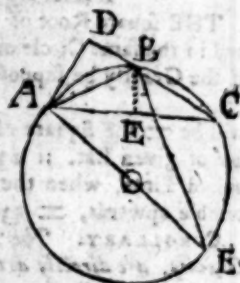
Mr. Roberts, Mr. Hartley, Mr. George Grant of Mr. Judson's School, Mr. Alexander Rees (from the *Gentleman's Diary*, 1769, P. 41), Mr. Michael Taylor, Mr. Pearson, Mr. Curr, Mr. Hardy, and Mr. Milne, answered it.

This Sort of Questions (more laborious than curious) is to exercise the young Algebraist and Geometrician.

XXV. QUESTION 447, answered by Mr. George Coughron.

$\frac{241.3957}{3.1416} - 25 = 26$ is the Semi-Conjugate; whence, if 25 and 20 be put = a and b , and $\frac{1}{2}$ the Side of the required Square = x ; then will $\frac{b^2}{a^2} \times a^2 - x^2 = x^2$; th. $4x^2 = 4a^2b^2 \times \frac{1}{a^2 + b^2} - 1 = 975.609756 =$

Area of the Square, and its Side = $2x = 2ab \times \frac{1}{a^2 + b^2}$ equal to 31.2347, &c.



Mr. Robinson's Solution.

PUT $ab = 50 =$ the Transverse, and $2x =$ the Conjugate Diameter ;
then $2\sqrt{4b^2 + 4x^2} + \frac{2x}{3} = 141,3957 = c.$

This Equation being solved, $x = 20$; therefore $2x = 40 =$ Conjugate Diameter, which put $= 2a$; then we shall have $\frac{ab \times d}{\sqrt{b^2 + d^2}} = 31.235.$

Mr. James Mascroft determines the Side of the inscribed Square $= 31.22$, (near the above Quantity.)

Mr. Hicks gives this *universal* Theorem for finding the Side of a Square inscribed in any Ellipsis :

Divide one Fourth of the Rectangle of the Squares of the Semi-Transverse Diameters by the Sum of the said Squares, and the Quotient will be the Area of the inscribed Square ; whose Square-Root will be the Side of the inscribed Square sought.

By this Theorem he makes the Side of the inscribed Square $= 31.2.$

Mr. Judson ; Mr. James Wood, of Newcastle ; Mr. Michael Taylor ; Mr. John Fryer, of Trinity School, near Newcastle ; and Mr. W. Hardy, of Cottingham, also answered it.

XXVI. QUESTION 443, answered by Nemo, the Proposer.

HE gives for the true Answer — *Nil.*

Mr. Michael Taylor, near Newcastle, says that the Proposer being greatly out of his Latitude, he is certain that his Iron Rod will never turn if it be let fall directly perpendicular, with its Vertex downward.

Mr. Coughron also observes, that since the Vertex of the Cone is directly downwards, it must certainly continue to fall so, as its Tendency is no greater to one Side than another : *These Solutions confirming one another.*

Mr. Judson observes, that, for Want of putting his Name to every Solution and Question (as Correspondents should do, to prevent Mistakes in collecting and transposing the Materials sent us,) Mr. W. Oliver, of Beamister, was inserted to his Solution of *Quest. 20*, the *Prize-Question*, and 3 new Questions, last Year. He expresses his Approbation of our *universal Rule of Proportion*, in last Year's *Palladium*, to this Effect. " In my Opinion it is as useful an Improvement in Arithmetic as any that has been made : This Rule is of great Use in my School, for its Plainness, Ease, and Perfectness. " — He subscribes for a *Dozen of Palladiums* for 1772, and Mr. Hardy, of Cottingham, near Hull, subscribes for as many, for the Use of their Pupils.

Prize-Question, answered by Mr. George Coughron, late of Wreighill, Northumberland, but now of Newcastle upon Tyne. Feb. 26th, 1772.

THE Value of 150*l.* Annuity, sold for ever, compound Interest, at 4 per Cent. per Annum, is 3750*l.* — By *Simpson's Annuities*, Prob. X. p. 51. and Tab. 3d, p. 42, the Value of an Annuity, to continue as long as either of two Persons living, whose Ages are 32 and 37, Interest at 4 per Cent. is worth 15.85 Years Purchase ; whence 3750 divided by 15.85, the Quotient will be 236*l.* 2*s.* nearly ; which is the yearly Sum the Buyer must pay to the Seller, required.

Answered by Mr. Richard Judson, of Beverly.

THE present Worth of the Estate $= \frac{150}{.04} = 3750*l.*$ By *Simpson's Tables* of Annuities upon Lives, the Value of the Man's Life 37 Years old $= 11.9$ Years Purchase $= 2800$; and the Value of the Woman's of 32 Years $= 12.7$ Years

38 THE BRITISH PALLADIUM, OR

Years Purchase = p : Put $r = 1.04$. Then, by a known Theorem,

$$\frac{m}{m + p - r - 1 \times mp} = 8.14 \text{ Years, the Value of their joint Continuance;}$$

and $11.9 + 12.7 - 8.14 = 16.46$ Years, the Value of the Life of the longer Liver. Now, to find what Annuity, to continue 16.46 Years = t , will =

3750*l*. Purchase = p , we have this Theorem; $\frac{pr^t \times r - pr^t}{r^t - 1}$ is equal to 315.86513*l*. the required Annuity.

Mr. Sadler makes 236*l*. 12*s*. nearly, for the Annuity.

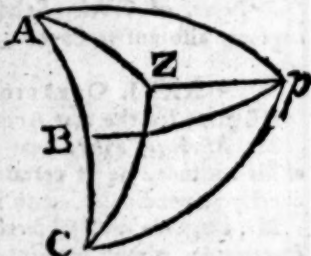
Mr. W. Hardy, of Cottingham, makes 236.539*l*. the required Annuity.

Grimsbornet makes 254*l*. 9*s*. 2*d*. nearly, each yearly Payment, by Solutions on different Principles.

N. B. Mr. Hardy's Solution nearly agrees with Mr. Coughron's.

NAVIGATION-QUESTION I. Page 69, in last Year's Palladium, proposed by Mr. Maskelyne, in the Nautical Ephemeris, 1771, answered by Mr. Coughron,

LET the annexed Figure represent the same Things as those to my Solution in Page 42, last Year's Palladium; then, by the same Method which I have there used, I find $AC = 41^\circ 29' 4''$, and the Angle $BCP = 85^\circ 16' 36''$, and from thence $\angle ACZ = 59^\circ 51' 26''$, and the Angle $ZCP (= ACP - ACZ) = 25^\circ 25' 10''$; lastly, ZP is found = $42^\circ 26' 16''$ = the Complement of the Latitude, and therefore the Latitude itself = $47^\circ 33' 44''$; whence the Times of Observation are found $10^h 21^m 40^s$ A. M. and $1^h 11^m 40^s$ P. M. and therefore the Watch is $2^m 20^s$ too fast. — Lat. by Mr. Maskelyne $47^\circ 20' N$. (according to the Amsterdam Method, Naut. Epb. 1771) who affirmed it to be a Truth. — Avast!



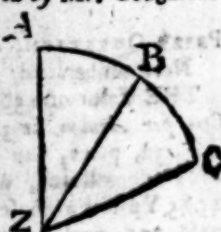
NAVIGATION-QUESTION II. in last Year's Palladium, and in the same Page, proposed by the same Gentleman, answered by Mr. Coughron.

BY a Process similar to the above, I find the required Latitude = 50° , exceedingly near, and therefore the Watch 13 Minutes too slow.

Note, there is a Line left out, in proposing this Question. — Mr. Astronomer Royal has here succeeded, and needed no repeated Operation.

QUESTION III. p. 70, proposed by the same, and answered by Mr. Coughron.

LET ABC be an Arc of the Equator, B, C , the Places of the Sun, and Z the Zenith; then, since the right-angled spherical Triangles, AZB, AZC , have the same Perpendicular, AZ , we shall have, as Cofine $ZC : \text{Cofine } ZB :: \text{Cofine } AC : \text{Cofine } AB$; and therefore, as $\text{Cofine } ZC - \text{Cofine } ZB : \text{Cofine } ZC + \text{Cofine } ZB :: \text{Cofine } AC - \text{Cofine } AB : \text{Cofine } AC + \text{Cofine } AB :: \text{Tangent } \frac{ZC - ZB}{2} : \text{Cotangent } \frac{ZC + ZB}{2}$



$$\frac{ZC + ZB}{2} :: \text{Tan. } \frac{AC - AB}{2} (= \frac{BC}{2}) : \text{Cot. } \frac{AC + AB}{2}, \text{ by Lemma on P.}$$

30 of Simpson's Trig. 2d Edit. whence, as BC, ZB, ZC , are given = $30^\circ, 61^\circ 07',$ and $69^\circ 18'$, respectively, $\frac{AC + AB}{2}$ is found = $30^\circ 1' 40''$, and $\therefore AB \& BC = 15^\circ$

$15^{\circ} 1' 40''$, and $45^{\circ} 1' 40''$; consequently the Watch is 6 Seconds and $\frac{2}{3}$ thirds too slow. — Again, in the right-angled Triangle ZAB are known AB, and ZB; from whence ZA is found $= 59^{\circ} 59' 31\frac{1}{2}''$ = the Latitude required. — Mr. *Astronomer Royal* determined the Lat. to be $= 60^{\circ}$; which must be true, he says, because of its coming out like the fictitious one supposed, viz. 60° .

CORRECTIONS of last Year's PALLADIUM.

P. L.

31. 8. fr. the Bottom, for $-xy^2$ and $\overline{502}^2$ read xy^2 and $10 + \overline{250}^2$

33. 3. from the Bottom, for *computed* read *compound*

Mr. *Alexander Rowe* sends the following correct Solution to *Quest. 405*, confirming Mr. *Robinson's* and Mr. *Coughron's* Solutions, at p. 33, *Palladium 1771*.

$$\text{PUT } 40 \times 30 = b; \frac{1200 + 40}{1200} = \frac{124}{120} = \frac{31}{30} = 1.0333, \&c. = R;$$

$t = 17$ Years; and $a =$ present Worth of the Estate in Reversion. Then

$$(\text{by Mr. Emerson's Algebra, B. II, Prob 32, Cor. I.}) a = \frac{b}{R^t} = 6871. 4s.$$

$\frac{5}{8}$ d. W. W. R.

Cor. If $R = 1.03$, the rest as before; then $\frac{b}{R^t} = 7261. \text{os. } 4\frac{1}{2}\text{d. nearly}$

equal to my former Answer, at p. 33, *Palladium 1771*, at 3 per Cent.

N. B. We thank Mr. Rowe for his Diligence and Regard to Truth.

Page 34. The Answer Mr. *Coughron* sent to *Question VI.* corresponds exactly with those printed; only he compared the Force with that of Gravity, or the Velocity generated by a heavy Body falling one Second, and they with a Body whose Velocity is one Foot per Second.

Page 36. Mr. *Coughron* observes, that Mr. *Hartley's* Solution to *Question IX.* is wrong; for it is evident that the *Ellipsis* cannot touch the Circle at the Extremity of the Transverse, as he has supposed it. He says, he is also wrong in his Solution to *Question XIX.* in saying that there is given the Base of a Cone, to find its Solidity a Maximum; for it is plain that the Solidity in such a Case may be taken as great, or as small, as you please.

Page 39, Line 15 from the Bottom, for $\frac{5}{75}$ read $\frac{5}{73}$.

Page 40. $61^{\circ} 19'$, in the Solution to *Question XII.* is the Latitude itself, and not its Complement; and therefore the *Question* was wrong proposed, as Mr. *Coughron* observed in his Solution last Year.

Page 42, Line 8 from the Bottom, for *and* read *as*.

————— 3 from the Bottom, for AC read AB.

Page 48. The Difference of the Answers to *Question XX.* prompted Mr. *Coughron* to re-examine his own Solution, and he has found it to agree exactly with that printed; and therefore concludes his Numbers to be true.

Page 49, Line 17 from the Bottom, for $\sqrt{5+2}$ read $\sqrt{5+1}$.

————— 9 from the Bottom, for *when* read *where*.

Page 50, Line 14 from the Bottom, for $DF + FG$ read $\overline{DF + FG} \times$.

————— 12 —————, for FG^2 read FG .

————— 10 —————, for *simple* read *Simpson's*.

————— 9 —————, for $DF \times DF \times DH$ read $DF \times DH$.

Page 51, Line 2 from the Bottom, for $\frac{1}{2}FG$ read $\frac{1}{4}FG$.

—— To the End of Line 8 add *Seconds*.

XVI. *Question* 367, *Palladium* 1768.

The Problem to find the least Cone that will circumscribe a Solid, whose Equation is given $a^3 - x^2 \times y^3 = x^4$ is unlimited and impossible; because when $y = 0$, $x = 0$; or when x is infinite, y is so. Also $y = \frac{a}{x} \sqrt[3]{\frac{x^4}{a^3}}$, not $\sqrt[3]{a^4}$, an *Incorrection*.

Page 55, *Palladium* 1769, $y = \frac{x^4}{a^2 - x^2} \sqrt[3]{\frac{a^3}{x^4}}$, when $x = a$, y evidently $= \frac{a}{0} \sqrt[3]{\frac{a^3}{a^4}}$, not $= \sqrt[3]{a^4}$; an *Absurdity* of the Answerer.

An impertinent Pretender to Science, who signs *Boltoniensis*, (or *Toddensis*, or *Smithfieldensis*,) objects to the Reasons given for a small Correction of Compound Interest, *Palladium* 1768, p. 32, 33, 34, 35, who abolishes Law and Custom, *quem penes arbitrium est, et jus, et norma*, and carps at *Palladium* 1766, p. 62, for what is maintained to be done by Mr. Emerson, p. 355 of his *Algebra*, who makes no Compound Interest for less than a Year. But this pretending Critic only proves his own Ignorance and Impertinence: He has not the Talents of a Cobler, while he assumes the *Mathematician*. Such strange Creatures as he is are unfit for rational Society, and unentitled, by their Behaviour, to Conversation or Correspondence with Gentlemen of any Class.

Kúros úmuat' íxuv. Hom. Il. I. l. 225.

Thou Dog in Forehead. Pope.

In the Letter signed as above-mentioned, the Place of Truth and Argument was supplied by impudent and ignorant Assertions, with impertinent and indecent Epithets. At the same Time we would not be thought insensible of the Defects of the *Palladium*, in general, nor of our own Defects, in particular; for the former of which we are not, nor will be, answerable. The Defect of undeserved Reproach and Ill-Manners is a greater Blemish.

————— *Pudet hæc opprobria nobis*

Et dici potuisse, et non potuisse refelli. — Ovid. *Metam.* I. v. 758.

✍ Several Correspondents acquaint us: that they have received anonymous Letters from London, containing a printed Libel against the *Palladium*, its Correspondents, and the Compiler thereof; who observe, that the Authors thereof (bring a Work of Refinement above the Genius of one Author) have been predicting their own Fortunes!

The Nature and Dimensions of a Spiral on the Surface of the Globe, from any Point, or Latitude, to the Pole.

Though the Number of Revolutions of a Spiral (making constantly the same Angle with the Meridian) about the Pole be infinite, and performed in a finite Time, yet the Sum of all those Revolutions will be an exact and determinate finite Quantity, for the same Reason that the Sum of an infinite decreasing geometrical Progression is finite and determinate: For if a Body moves in the first Moment of Time 10 Miles, in the second 9, in the third $8\frac{1}{10}$, and so on infinitely, in the Ratio of 10 to 9, every two succeeding Moments of Time, the whole Distance moved over by such Body will be precisely equal to 100 Miles, and not the least Quantity or Distance more or less; as may be proved by the well-known Rules for summing an infinitely decreasing geometrical Progression, as the above. — Hence, the Distance, being finite, will be moved over in a finite Time, at a certain Ratio of Motion.

A PROOF,

A PROOF, to the Commissioners of Longitude, of the Insufficiency, or great Defect, of Mr. WITCHELL's Rule, (inserted at P. 18 of the Nautical Almanac and astronomical Ephemeris, 1772), for determining the true, from the observed Distance of the Object at Sea, for helping a Ship's Reckoning in Longitude: According to the Palladium Author's universal and correct RULE of determining the true from the observed Distance. See the Question at P. 21 of Mr. Emerson's Appendix to his Course of Mathematics.

			Logarithms.	
Observed {	Moon from Star . . .	2 20	Constant Log.	0.3010300 of 2.
	Moon's Zenith Dist.	80 21 = A	Lo. Sine Coar.	0.0061891
	Star's Zenith Dist.	78 46 = B	Coar.	0.0084010
Sum			Sum	0.3156201
From the Half-Sum				
Subtract A, rem.			Log. Sine	7.8157982
Subtract B, rem.				8.5337254
Fr. A, sub. Dif. D's Par. & Ref.				
Rem. D's true Zen. Dist.				9.9926544
To B, add Star's Refract.				
Sum, *'s true Zen. Dist.				9.9916991
Diff. of E and F			Rejecting Tens	6.6494972 Sum.
			Nat. No. corresp.	0.0004461 } take
			Nat. Cosine G	0.9999340 } Diff.

True Dist. D from * 1 50 2
Universally and correctly, required.

N. B. If the Star's Refraction is taken 4' 40", the Answer comes out correctly, 1° 50' 4".

Arithmetically, and nearly.

Moon's Parallax in Altitude 56' 10" = P, and $\frac{1}{2}$ P = 28'

Star's Refraction in Altitude 4 0 = R, and $\frac{1}{2}$ R = 2

Sum 60 10

Half 30 5 = H, and $\frac{1}{2}$ H = 15.

Log. Dif. 1.

$$\begin{array}{rcl}
 A - \frac{1}{2} P & = & 79^{\circ} 53' \\
 B + \frac{1}{2} R & = & 78 \ 48 \\
 \hline
 C + \frac{1}{2} H & = & 0 \ 37 \\
 D - \frac{1}{2} H & = & 1 \ 41 \\
 \hline
 73456 & + & \\
 \hline
 \text{As } 158172 \text{ to } 2 \text{ so } 2215321 \text{ to } 28' \ 0'' & - & \\
 \hline
 & & 2 \ 20 \ 0 \\
 \hline
 & & 1 \ 52 \ 0
 \end{array}$$

General Correction.

Take $\frac{1}{2}$ of the first Correction = c = 7'.

Then, C + $\frac{1}{2}$ H, + $\frac{1}{2}$ H - c = 0° 45' 95448 + }
D - $\frac{1}{2}$ H, - $\frac{1}{2}$ H - c = 1 20 53941 - }

41507 +

Ans.

As 149389 to 2 so 2215321 to 29' 39"

See the Seaman's Guide to the Longitude, } 2 20 0
or Key to the Nautical Ephemeris. }

1 50 21

1 50 2

Error, in this extraordinary Instance, but . . . 19. Palladium-Author.

The FALLACY of Mr. Witchell's RULE, (p. 18. N. Eph. 1772), proved.
To determine the true, from the foregoing observed, Distance of the Moon from a Star
(or the Sun), according to Mr. Witchell's Rule.

Observed { D Z. Dist. 80° 21' } Dif. D's Par. and Refr. 51' 30" = D.
 * Z. Dist. 78 46 } Star's Refraction 4 0

Sum 159 7 . . . Half 79° 33' 30" L. Tan. 10.7345074

Dif. 1 35 . . . Half 0 47 30 L. Tan. 8.1404233

Obs. Dif. D fr. * 2 20 . . . Half 1 10 0 L. T. corresp. 11.6911158

— 3 12* Dif. Segmts Base 74 48 15 = Arc A Ta. 10.5660465 (reject 20)

— 35 3† Dif. fr. A, less Seg. 73 38 15 Comp. 16021' 45" Ref. 3' 12" sub.

+ 2' 42", Emerson's Correction, 1st Correction at *.

— 38 15 Sum, greater Seg. 75 58 15 . . Co-Tan. 9.3977119

2° 20 0 D's Z. Dist (greater than *'s) 80 21 0 . . . Tan. 10.7694614

1 41 45 Arc D . . . 51 30 . Pro. Log. 0.5435

2d corrected

Dif. D fr. * 2d Correction, * the D 35 3† . Pro. Log. 0.7106733 (reject 20)

1 50 2 true Dist. Sum 1 26 33 . Pro. Log. 0.3180

Difference 16 27 . Pro. Log. 1.0391

8 17 2d corrected. Dif. 1 41 45 Tan. 8.4714

Mr. Witchell's Error, Constant. Log. 9.8045

about 4° Longitude. 3d Correction not 1" . . . 9.6330 (rejecting 10)
[for you cannot 20, as Mr. Witchell directs.

By Art. 4. Nautical Ephemeris, 1772. P. 22, Mr. Emerson's Correction at
the Star (or Sun) copied by Mr. Witchell.

* Zen. Dist. app. 78° 46' 0" Log. Tan. 10.7019989 } inverting the Pro-
Dif. fr. A aforesaid 73 38 0 L. Co-Tan. 9.4677633 } portions in using
Star's Refraction 0 4 0 Pro. Log. 1.6532 } pro. Logarithms.

Correction at *, ac-

cording to Mr. Emerson } + 2 42 Pro. Log. 1.8229 (rejecting Tens).

Witchell's Cor. there } — 3 12*

by Refraction above } — 5 54
His Dif. — 5 54

Mr. Witchell's fourth Correction.

Sum pro. Logs. Sum & Dif. of Cor. * (or ☉'s) Z. Dif. & 1st Cor. (4' & 2' 42) 1.7501

Sum pro. Logs. Sum & Dif. of Cor. of D's Z. Dif. & 2d Cor. (51' 30" & 35' 13") 0.6785

Log. Sine of Dist. of Objects twice corrected (1° 41' 45") 8.4697

Constant Logarithm 9.5029

Sum (rejecting twice Rad.) 4th Correction 1' 11" 30", or 1' 11" Pro. Log. 0.4012

A most wonderful and inconsistent Correction, like the third!

N. B. Hence the absolute Unfitness of this Method of Approximation for the
Purpose proposed is infallibly proved. And hence, awast, Portsmouth Academy!

* See the Seaman's Guide to the Longitude, or Key to the Nautical Ephemeris, sold by Mr. D. Steel, on Little Tower-hill, for consistent, general, and true

true Rules of Calculation, and for a Correction of Mr. Maskelyne's Errors and inconsistent Rules for the Longitude, published in the Nautical Almanac and Astronomical Ephemeris for 1772; correcting the Errors and Inconsistencies respecting this Sort of Calculations in other Places, made by his Assistants, for executing the Office of Astronomer Royal: who requires abler Helps and Judgement.

Mr. Dunthorne (in Naut. Ephem. 1772) has been so candid as to correct his Error [or wrong Rule in the Explanation and Use of the Nautical Ephemeris formerly published] that we acquainted him of in the said Key. Mr. Witchell's and Maskelyne's Rules are not worth improving, (if it can be done); and Mr. Lyon's prolix Rule none will use but himself, though recommended by an Astronomer-Royal.

Third Correction, according to Mr. Emerson's Method of Approximation.
Moon's Parallax and Refraction in Altitude $51' 30''$

Moon's first Correction 35 2

Sum $1^{\circ} 26' 32''$
Difference 16 28

Pro. Log. 0.3181
Pro. Log. 1.0386

Half, 1.3567
Little Perp. 37 45 (see Key) Pro. Log. 0.6783

Log. Tan. of same Comp. 1.9593

Half little Perp. 18 52 Pro. Log. 0.9796
Observed Distance $2^{\circ} 20' 0''$ Tan. 3.6101

Third Correction + 5 5 1.5400
First Correction + 2 42 not - $2' 42''$, as Mr. W^{itchell} makes it.

+ 7 47

Second Correction - 35 2

Three Corrections - 27 15
Observed Distance $2^{\circ} 20' 0''$

1 51 45 According to Mr. Emerson's
True Distance 1 50 2 Method of Approximation, who justly condemns
Error 2 43 these defective Methods,
as insufficient, though his

Method far exceeds those by *Witchell*, *Maskelyne*, and others. See our Key.

By Dunthorne's Rule, improved as follows.

Moon's app. Distance from Star $2^{\circ} 20' 0''$ Col. $87^{\circ} 40' N.$ Sine .9991709

Star's apparent Altitude 11 14 0

Moon's apparent Altitude 0 10 0

Diff. app. Altitudes. From. 1 35 0 Col. 38 25 N. Sine .9996182

Diff. .0004473

Corr^d D's Alt. $51' 30''$

Log. correspondent 6.6505987

Star's Refraction 4 0

Subtr. Log. from Tab. II. 1020

Sum 55 30 Subtr. 55 30

Rem. 6.6495787

Nat. N^o. corresp. .0004462

Difference of the true Altitudes 0 39 30 Col. $89^{\circ} 20' 30'' N.$ Si. .9999340

38 9 5 N. Sine .9994878

Cosine 1 50 2 required.

* * The

* * The above Operation shews, that Mr. *Dunthorne's Rule* is far preferable to that by Messrs *Witchell*, *Maskelyne*, and *Lyons*, and is the only scientific one inserted in the *Nautical Ephemeris* for 1772, as he has there improved it, (when the Distance of Objects exceeds 90°), since we first noticed its Defect to him in our *Key* to that Work. Therefore all *Rules* to find the true from the observed Distance, in the *Nautical Ephemeris*, ought to be rejected as insufficient, except Mr. *Dunthorne's*; whose Certainty is proved in the above unusual Instance, where Mr. *Witchell's Rule*, and the Rest, as uncertain, confused, and deficient as his, are found useless, and to fail.

See the *Seaman's Guide or Key to the Nautical Ephemeris*, for our short and correct Method of Solution by natural Sines. See also Mr. *Emerson's Appendix to his Course*, for his accurate, short, and easy, Solution, by natural Sines, proving the same as above.

NEW ÆNIGMAS.

I. ÆNIGMA 217, by the Rev. Thomas Vaughan, M. A. of Magpeth.

LADIES, a num'rous Race does you accost,
 Who no high Origin could ever boast,
 On Land and Water frequently we're seen,
 And often sport upon the flow'ry Green.
 Sometimes we fly about in open Air;
 But that, you may believe, is very rare.
 We dwell in France, in Spain, in Germany,
 In England, Scotland, Holland, Italy;
 In Portugal, in Sweden, Prussia, too;
 In Turkey, with the Russian Army now.
 As to our Colours, they are only mean;
 In them there is but little Beauty seen.
 This Hint conspicuous take — We once were wet
 In the Heart's Blood of a Scotch Baronet.

II. ÆNIGMA 218, by the Rev. Thomas Vaughan,

ÆNIGMATISTS, would you incline,
 We're sure that you can make us shine;
 Then, pray, upon us shew your Wit,
 For we are for Ænigmas fit.
 Of diff'rent Shapes and Forms we're made,
 By Artists who are skill'd in Trade,
 Of Steel or Brass we oft appear;
 At other Times, in Silver clear:
 Sometimes of Box-wood, Broom, or Yew,
 Of Horn, of Bone, and Iv'ry too.
 We oftentimes on Hinges move,
 Also with Screws, when you approve.
 One Night there is, in ev'ry Year,
 When Numbers of us do appear;
 When we are forc'd to toil and work,
 And labour hard like any Turk.
 The Young without our Help can do;
 But with the Old it is not so:
 Without our Aid, they needs must own,
 Of that Night's Dainties they'd taste none.
 And, farther, take it for a Fact,
 Without Assistance we ne'er act,

III. ÆNIGMA

III. ÆNIGMA 219, by Gemini, of Morpeth.

SOME ascribe me to the Fair,

As their most peculiar Care ;

My Existence some deny ;

Let them view the *spangled* Sky,

When the Weather is serene,

I apparently am fern.

So with Meads in blooming May,

When the Flow'rs are fresh and gay,

The *Palladium* too, each Year,

Makes me plainly to appear,

At a Midnight Ball I'm seen ;

Oft'ner on the sportive Green ;

Midst the blooming lovely Fair,

Easy, free, and debonnaire.

Health and native Liberty

Join in the Support of me.

Quite in vain are human Arts ;

Nature only me imparts.

Though I very rare am found,

Ask the World, and I abound.

In the Form, or Face, or Mind,

Each pretends my Charms to find ;

'Tis *Self-Love* instead of me ;Then say, *Adopts*, what I be.

IV. ÆNIGMA 220, by Mr. W. Swift, of Stow.

FIVE Letters do contain my Name ;

Forward, or backward, reads the same.

An *Instrument* you'll find I'm made,And useful in the *Mason's* Trade.

V. ÆNIGMA 221, by Mr. Swift.

THREE Letters will my Name explain,

If you these Letters can obtain ;

And that you soon may find me out,

Like Fruit I grow, is past a Doubt.

The Ladies Mirth from me partake ;

Their Jokes I often help to crack.

My Name revers'd, you'll find, I strait

Become a Measure and a Weight.

VI. ÆNIGMA 222, by Mr. Swift.

FOUR Letters form a *Scripture* Name,

(Each Half of Letters is the same,)

Strait, or reverse, if read, you'll see

The nearest Kin I have to me.

VII. ÆNIGMA 223, by Mr. J. Scott, of Cawthorn, Yorkshire.

CROSS made am I, prone to perplex,

Though not in ev'ry Country found :

My Aid I give to either Sex,

As, in my Duty, I am bound.

On *Alexander*, fam'd the Great,Whose Charms all *Asia* did subdue,

I always did attendant wait,

Whatever Schemes he had in View,

Sagacious Geniuses I try,

In curious Speculations ;


Shew *Emerson* a Reason why
 He makes his Operations.
Coughron, Hardy, Rowe, and others I know,
 Expertly can me exercise :
 But those, I protest, who handle me best,
 Will stand a good Chance for the Prize.

VIII. *ÆNIGMA 224, by Mr. Nicholson, of Newport, in the Isle of Wight,*

STANDING on *Fiquet*, which the Soldiers dread,
 Brings me to Life, who just before was dead.
 Hanging, on wicked Courses, oft does fall ;
 But I, *unbung*, can shape no Course at all :
 Yet, soon as hung, I scamper to and fro,
 Looking out sharp around me as I go ;
 And though I have no Eyes, I cannot rest,
 Until I find the *Flaw'r* that I love best :
 So *Sopby* likes her Lover, still reclin'd
 Upon her Breast, and never proves unkind.
 None to his Friend more *constant* is than I ;
 Yet none more *wav'ring* underneath the Sky :
 Though for my Constancy I noted be,
 Yet fickle Mortals learn to rove from me.
 All Parts of Earth and Seas I travel round,
 Yet I at Home am always to be found,
 Say then, dear Ladies, what I am ; for you,
 Or none, can prove such *Contradictions* true.

IX. *ÆNIGMA 225, by Miss H——y, of the Isle of Wight,*

MY Shanks unto my Shoulders join ;
 Upon my Lips I stand ;
 No Lady (be she e'er so fine)
 But takes me in her Hand.

 Whoever sends the best Answer, in Verse, to the following *Ænigma*, before
 Candlemas-day next, has a Chance, by Lot, to win 5, 4, and 3 Palladiums.

PRIZE-ÆNIGMA, by Mr. Sadler, of Whitchurch,

MY Parent was taller than bold *Robinhood*,
 And liv'd many Years by the Side of a Wood :
 In City and Country I often abide ;
 Dwelt with an old Woman, close by the Road-Side.
 I'm great and I'm little, I'm round and I'm long ;
 I'm active and passive, and sportive and strong.
 Both above and below I'm belted quite round.
 Long Journeys I travel, yet pass little Ground.
 My Belly's capacious, and Mouth opens wide,
 I run without Legs, work without Arms beside.
 I've a *Hat* that is large, and far round does expand,
 And my *Crown* is quite open, to put in your Hand.
 Two *Ears* I have got, seated next to my Mouth ;
 And attended I am both by Age and by Youth.

Sometimes an *Engagement* I have with Friend *Roger* ;
 At his House, my dear *Sopby*, I'm always a Lodger :
 In the Combat he toils, 'till the Sweat at his Nose
 Trickles down to his Beard, and from thence to his Hose
 And when I've a Frolick with Mrs. *Ann Wheedle*,
 She jerks me about as she works with her Needle :
 Whose *Jerks* oft repeated, she makes me run o'er,
 And bespatters her Linen all over before.

In my Belly a nimble One's often confin'd :
 I trouble the fair One, and torture the Mind.
 A Chaos I hold, of some thick and some thinner ;
 And help to provide *Sophy Horner* a Dinner.
 A Production from me springs to Form very soon,
 And my Child that comes forth much resembles the Moon.
 My Motions, in Labour, are strange, you must know ;
 I tosa, tumble, bounce — You may tell *Polly Stow*.
If these are Riddles, Quirks, and Puns,
Let Sophy tell her Favourite Ones.

Mr. Lacey's *Enigma*, of *Bridport*, and Mr. Nicholson's, of *Newport, Isle of Wight*, could not come in this Year ; nor others of Merit.

NEW QUERES.

I. QUERE 222, by Mr. Geo. Hicks, of *Reedness Free-School*.

UPON what Part of the terraqueous Globe has a Ship the least Pressure upon the Water ? 10

II. QUERE 223, by Mr. G. Grant, Pupil to Mr. Judson, of *Beverly*.

AS Churches, in general, (excepting those built of late Years,) decline, more or less, to the North-West, and South-East, may it not with Propriety be supposed, that when these were first built, they stood then due East and West ? And, from the present Declination of any particular Church given, may not the Date of its Building be nearly determined ?

III. QUERE 224, by *Historicus*.

WE read in *Herodotus*, (*Erato*), that, when it was objected to *Demaratus*, King of *Sparta*, by his Rival *Leutychides*, that he was not the Son of *Arifon*, his reputed Father, but a supposititious Child, he conjured his Mother, in a solemn Manner, to reveal the Truth : Who, in Answer, observed to him, that his Enemy framed the Objection merely because he was born before the Expiration of ten Months ; but that the Insinuation was suggested by Ignorance ; for Women, she remarked, were not always so late in their Delivery ; some Children having been born at the End of nine Months from their Conception, and some even at seven. — From this Story, be it true or false, it appears that a Child of nine Months was judged an early Visitant in *Greece* ; at least, by the Historian. — Quere, are the Women of any Country (particularly in that Part of the World) known generally to exceed that Term, or not ? 11

IV. QUERE 225, by the same Correspondent.

WITH what Propriety is the Expression, *equivocal Generation*, substituted for *spontaneous Generation*, by *Boyle*, *Ray*, *Derham*, and other Writers in Natural Philosophy ?

NEW REBUSES.

I. REBUS, by Mr. G. Lacey, of *Bridport*.

To a Weapon, much us'd by the sly Archer *Cupid*,
 A Part of the Face must be join'd ;
 Which done, with much Ease, unless you are stupid,
 A Town's Name of Note you will find.

II. REBUS, by Mr. Nehemiah Truby.

TO a Monarch, who Kin to *Pindar* did claim,
 For his Valour renown'd in the Annals of Fame,
 Join a Bird, that with us in the Summer abides,
 And builds her Nest openly on our House Sides ;
 'Twill shew you a Noddy, in ample Proportion,
 Who, addling, Audied perpetual Motion ;
 Who was once a Booseller, and Maker of Hats,
 And could prognosticate by the Owls and the Bats ;

THE BRITISH PALLADIUM, OR

Who, for a Sage *Merlin*, is now, as we judge it,
Transform'd to a *Tinker*, and carries a *Budget*.

III. REBUS, by the Rev. Thomas Vaughan, M. A. of Merpeth.

THREE *Fourths* of a *Fence*, and three *Fourths* of a *Line*,
And Half a *King's* Name, in the Scriptures divine;
Then add a *strong Accent*, and there will be found
A *Baron's* Seat fam'd *Northumberland* round.

IV. REBUS, by Gemini, of Merpeth.

TO two *Fifts* of an *Insect* for *Industry* fam'd,
Join two *Fifts* of that *Worth*, when *true Greatness* is nam'd;
And what a *right Heir* is, as soon as he's born;
'Twill shew you *who* much does this Nation adorn.

V. REBUS, by Mr. John Bailey, of Middleton, Yorkshire.

TO a *Cardinal Point*, join the *Sign* of a *Fold*,
And a *Town's* Name in *Kent* it will plainly unfold.

Mr. Michael Taylor sent 2 new *Rebuses*, which, for Want of their Solutions being explained, cannot be inserted.

NEW PARADOXES.

I. PARADOX, by Mr. George Newland, in the Isle of Wight.

A Port, B, bears due *West* 40 Leagues from the Port A; yet a *Ship*, sailing from the Port A due *West* 40 Leagues, arrives not at the Port B.

II. PARADOX, by Oedipus.

IN all my Engagements I do what I can;

I engag'd with a *Lady*, and made her a *Man*.

The Paradox, sent us by Mr. Bayley, concerning the making a *Harlot* an honest Woman, &c. has been proposed and answered in a former *Palladium*, — The Genealogy and History of a *Witch* hereafter.

NEW QUESTIONS.

I. QUESTION 430, by Mr. John Shadgell (or Shadgett) of Ross, Herefordshire.

NEAR *Severn's* Banks, in *Albion's* Isle,

Where rural Sports the Hours beguile,

There dwells a *Lady* of Renown,

Whose Virtues all her Actions own;

Her beautiful Form and lovely Face

Proclaim her Goddess of the Place.

From what's annex'd, * I make no Doubt, in Years, and y her Fortune.

You'll find her *Age* and *Fortune* out.

II. QUESTION 451, by Mr. William Pen, of Chalfont.

A Person spent, at a Tavern, 10s. the 1st Day, 9s. 6d. the 2d, &c. at the Rate of 5 per Cent. less every Day than on the former Day: What Sum of Money did he spend?

III. QUESTION 452, by a Watchmaker in Northumberland.

A Clock has 2 Hands; one of which goes round in 1 Hour and a Half, and the other in 1 Hour and 2-3ds: Required, from thence, the exact Time of the Day, or Distance of Time, when the said Hands will be directly in Opposition to each other, next after their setting out together at 12 at Noon, and both moving the same Way. Also, required the exact Time of their Meeting, supposing them to move at the same Rate, the contrary Way, from the same Time of setting out together.

IV. QUESTION 453, by Mr. Robinson, of Biddick.

$$\sqrt{x} + y\sqrt{z} = 1730.$$

$$\sqrt{y} + z\sqrt{x} = 1466.$$

$$\sqrt{z} + x\sqrt{y} = 49.$$

Required the Values of x , y , and z .

V. QUESTION 454, by Kilwin, Northumberland.

TO find three Numbers in musical Proportion, whose Product is $= a$; such, that if the 1st be added to b , the 2d subtracted from c , and the 3d divided by d , the Numbers thence arising shall be in geometrical Proportion.

VI. QUESTION 455, by Gemini, of Morpeth, Northumberland.

A cylindrical Milk pail there is to be made,

To hold just three Gallons, to please the Milk-Maid,

With Wood of least Weight, or as light as can be:

The Dimensions describe to the Cooper, or me.

VI. QUESTION 455, by Mr. John Lynn, of Ruffis, Northumberland.

$$\left. \begin{aligned} x+y &= a \\ x^2 + y^2 &= b \end{aligned} \right\} \text{Required } x \text{ and } y \text{ by a Quadratic ?}$$

VII. QUESTION 456, by Mr. James Wood, of Newcastle.

WHAT three Numbers are those, whose Sum is 19, Product 240, and Sum of the Squares 125?

VIII. QUESTION 457, by Mr. Thomas Goodlad, of Cottingham, near Hull.

A Sphere of Wood, swimming in Rain-Water, had $\frac{1}{2}$ of its Superficies above the Surface; but, swimming in Milk, it had $\frac{1}{3}$ of its Superficies below the Surface. Required its Diameter.

IX. QUESTION 458, by Mr. Judson, of Beverly.

REQUIRED the Diameter of 4 Spheres inscribed in a Cone, whose Altitude is $= 20$, and the Diameter of its Base $= 30$ Inches; three of which shall touch each other, the Base and Sides of the Cone; and the fourth shall touch the other three Spheres and Sides of the Cone. Also, required the Diameter of the least Punch-bowl (being a Semi-Globe) that will just cover the first three Spheres.

X. QUESTION 459, by Mr. Pen, of Chalfont.

A Man has a Piece of Ground in triangular Form, whose Sides are in Proportion, as 2, 3, and 4, and the Area is one Acre: Required the Sides thereof.

XI. QUESTION 460, by Mr. George Hicks, of Reedness Free-School, Yorkshire.

IF the Perpendicular of any right-lined right-angled Triangle be equal to twice the Sine of the greatest acute Angle, the Sum of the Legs will be equal to the Square of the greater Leg; and their Difference equal to the Square of the lesser Leg. Required the Demonstration.

XII. QUESTION 461, by Mr. James F—r, of Newport, in the Isle of Wight.

TO divide a right-lined Triangle into 4 equal and similar Parts: And to give an ocular Demonstration to 32. Prop. 1. Euclid, independent of all other Propositions.

XIII. QUESTION 462, by Mr. Robinson, of Biddick.

REQUIRED the Dimensions of the least circumscribing Ellipsis to a Parallelogram, whose Length is 36, and Breadth 30, Inches.

XIV. QUESTION 463, by Mr. Alexander Rowe, of Reginnis, Cornwall.

A Gentleman, of 68 Years of Age, made his Will, in which he gave his 3 Nephews 4000*l.* viz. 2400*l.* to the eldest, of 23 Years of Age, and 1600*l.* to the youngest of 18, conditionally, that if either of them should die before him, the whole should fall to the Survivor of the two, after his Death. Required the Values of the respective Expectations, from the Date of the Will; the Interest of Money being admitted $3\frac{1}{2}$ per Cent.

XV. QUESTION 464, by Kilwin, Northumberland.

$$\left. \begin{aligned} x^2 + \sqrt{y^2 - x^2} &= 623.4595 \\ y^2 - \sqrt{y^2 + x^2} &= 89699.4605 \end{aligned} \right\} \text{Required the Values of } x \text{ and } y, \text{ a Lady's Age and Fortune.}$$

XVI. QUESTION 465, by Mr. Breese, of Adderly, late Pupil to Mr. Sadler.

IN a Pump Tree, how deep must an *Augur* just bore, * } * $3\frac{1}{2}$ Inches Diameter.
For the solid Content of a Foot, and no more ?

XVII. QUESTION 466, by Mr. William Breece.

A Silver Snuff-Box is made in the Form of the middle Zone of a Sphere, whose internal Solidity is 9.3295 Inches; the Top and Bottom Diameters are equal, and the Difference of the Sum of the Diameters, and Height (or Depth) of the Box = 4 Inches: Required the Dimensions thereof.

XVIII. QUESTION 467, by Mr. Michael Taylor, of Marley-Hill, Newcastle.

AT a certain Place in North Latitude, the Sun rose at $3^h 59^m 24^s$, and his Depression at Midnight was $70^{\circ} 37'$ with No th Declination. Required the Latitude where, and Day of the Year, 1771, when, this happened.

XIX. QUESTION 468, by Miss Polly Stow.

AT an independent Election, the Bill for all Expences came to 1221*l.* 11*s.* 1*d.* 1*g.* each Elector paid alike to a Farthing: Required the least Number of Electors, and what each Elector paid, without a Fraction.

XX. QUESTION 469, by Mr. George Newland, of Newport.

IF the Cavity of a Pair of Bellows, full of Air, be 240 cubic Inches, and they be compressed together in 1 Second of Time, required the Velocity of the Air through the Spouts of those Bellows.

XXI. QUESTION 470, by Quarter-Master Thorp.

TO find the sexagesimal Quantity, whose logarithmic Tangent shall be = 0; Quantity less than any assignable.

Whoever sends the best Answer to the following Question, before the 1st of March next, shall be entitled, by Lot, to 12 Palladiums.

PRIZE QUESTION, by Quarter-Master Thorp.

TO determine the Ratio of the Number of solar and lunar Eclipses that generally happen. Also to determine the greatest Duration possible of a solar and lunar Eclipse.

Several Correspondents send us Questions with expensive Cuts to be cut; and others of the same Things over and over again, (like Questions of Ladies Ages and Fortunes), sickening the Reader, and shewing a Dearth of Invention; which, therefore, cannot be inserted. Things of Novelty and Variety are wanted; plain and useful, and such as can be applied to Practice in the Affairs of Life.

N. B. Finding the Latitude of the middle Time of 2 distant Observations, by the Watch, at Sea, (allowing for the Ship's Motion,) to be shewn hereafter — With an Answer to the Hod-Carriers and Longitude-Calculators, executing the Office of Astronomer-Royal, who deny the Possibility of observing the Eclipses of Jupiter's Satellites with Glasses of certain magnifying Powers, with which they have been observed.

Prizes won. — Mr. Coughron, of Newcastle, is desired to send for 12 Prize Palladiums; Gemini, of Morpeth, for 4 Prize Æ. Palladiums; Mr. Nicholson, of Newport, in the Isle of Wight, for 3 Prize Æn. Palladiums, and Oedipus, of London, for 5 ditto, in their own Names and Hand-Writing, to Mr. Cole's, Mathematical-Instrument-Maker, in Fleet-street, London. — Mr. Hardy, of Cottingham, is desired to send for 3 Palladiums.

PROMOTIONS dans les REGIONS LUNAIRES.

1. LE Révérend Docteur O Piper, ancien Bosséman du Cheval-Marin, élevé à être grand Critique en Astronomie, Longitude, et Navigation, et Observateur grandissime en l'Observatoire de sa Majesté la Lune.

2. Monsieur le Chevalier D'On, Connoisseur et grand Calculateur des Transits et Eclipses, érigé en Astronome nécromantique.

3. Mynheer Casse Harden, Hattoniensis, autrefois Secrétaire de l'Office des Libels dans la Lune; maintenant élu grand Maître de la Sanction Pragmatique, et de la Société des Catamites; et encore Fauteur d'Appendice et Index aux Messieurs de l'Académie de Gotham.

4. Signior

4. Signior *Boltonienfis*, le Père des Muses *Smithsfeldiennes*, érigé en *Rbâteur* d'Impudence et de l'Art de *Contradiction* au Collège du *Nex-d'airain* dans la *Lune*.

5. Madame *Sophia Vagtale de Vitabit*, avec tous les anciens Titres et Emplois, élevée au degré de *Première Montreufe* du François d'un *Clincallier*, à l'*Académie des Complimens* sur le *Saffron-Hill* de la *Lune*.

6. Monsieur le Chevalier de *Vitabit*, aux Bas de Soye, et de l'Ordre des *grandes Culottes*, confirmé *Surintendant* et *Régulateur* général des *Patbiques* et *Cocus*.

7. Le *Boucher sanguinolent* des *Cochons* pour les *Juifs*, reçu comme *Premier* dans le Corps des *Volcurs de Nuit*, *Affassins*, et *Libelleurs*.

Those *Genilemen and Ladies*, who are pleased to favour the *Polladium-Author* with their Names and *Archievements*, (as many others have already done), shall be recommended for *Promotion* in their Turn, according to their several *Degrees of Merit*

INSPECTOR-GENERAL.

* * A certain Set must excuse us for rejecting all Sorts of *Connexion* or *Acquaintance* with them, and for not being angry at their *Personalities*; to whom we recommend their following better *Preccepts* and *Practice*.

'Tbe best Defence in Reason, we conceive,

Is so to act, that None shall ill believe.

Make none your Friend, till you have prov'd him true;

Your Mind, disclos'd, may be expos'd to View;

Acquaintance you'll find many — Friends but few.

A Friend in Pocket you will find the strongest,

Not apt to vary, and will last the longest.

For Information concerning *Ruffians, Libellers, &c.* see *The General Evening Post*, sold by *S. Bladen*, Number 28, *Pater-noster-Row*, from *Saturday March 9*, to *Tuesday March 12*, 1771, Extract of a Letter from *Portsmouth*: And the same Paper, sold by ditto, from *Saturday March 16*, to *Tuesday March 19*, following, a Paragraph relating to *Ruffians at Portsmouth*, in our *Chronicle*.

OF REPUTATION and FAME.

Commend not, till the Man is thoroughly known:

Applause misplac'd, you make the Faults your own.

All are not Halleys, to command our Praise:

What Alterations shame us since his Days!

1. THE Gifts scattered by *Fortune*, (*Birth, Titles, Honours, Riches, and Preferment*,) are in our Possession; but *Reputation* and *Fame* are in the Possession of others.

2. *Reputation* and *good Fame* are the Foundation of *laudable Actions* and *glorious Undertakings*.

3. *Reputation* is a *Jewel*; gained with *Difficulty*, and lost with *Ease*.

4. It is the *good Opinion* that others have of our *Merit*.

5. *Reputation* is like *Credential Letters* of *Recommendation*.

6. It is several Ways acquired, from the *Perfections* of *Body* or *Mind*; *Activity*, *Address*, *Politeness*, *Prudence*, *Justness of Dealing*, *Ability*, *Integrity* in *Office*, &c.

7. *Applause* is less durable than *Reputation*; because it requires fresh *Supplies* to support it.

8. A *Shew* of public Spirit, without an *Intention* of doing *Good*, will gain *Applause*; but *Reputation* gained requires some *Good* to be done.

9. Some *degrade* themselves, to put others upon *applauding* them; which, being seen through by the *Discerning*, renders these *Seekers* of *Applause* ridiculous.

10. Some praise others to their *Faces*, with a View of being repaid in the same Coin; but this *Cobweb* is so very thin, as rarely to catch *Flies* of any *Magnitude*.

11. A *good Reputation* is more necessary than *ready Cash*, for furnishing the useful Supplies of Life.

12. Reputation, lost by a *Misdemeanor*, or Oversight, is not easily, nor soon, recovered.

13. *False Report*, *Backbiting*, and *Slander*, are the capital Enemies of Reputation.

14. *Invectives*, *highly coloured*, seldom fail of Effect; but *low Scandal* and *immoral Abuse* can do no Harm.

15. It was *Machiavel's Maxim*, that, in throwing Plenty of Dirt, some of it will stick; but this *Dirt* must be of an *adverse* Composition.

16. The *strongest* and *most violent* Reproaches are the *least* injurious; because, as they generally proceed from *Envy*, *Hatred*, and *Malice*, they will not gain Credit with Men of Reputation and Judgement.

17. The *faint Accuser* is a more *dangerous* Enemy than the *bold Assertor* of bare-faced Lies and Scandal. The former, whilst he mixes Commendation with his Libels and Invectives, and pretends to be your Friend, (as if he inveighed against the *Vice*, and not the *Person*,) stabs you to the Heart! The *Presbyterian* and *Quaker* Stabbers backbite you to your Face!

Rege if you bide, and Prejudice lay down;

A Satyr's Smile is sharper than a Frown. Buckingham.

18. The *Savages* in the Desert lie in Wait for your Lives, to satisfy their Hunger; but the savage *Backbiters* prey on your Reputation, to satisfy their rancorous *Spleen* and *Envy*.

19. *Little Defamers* and *Backbiters* degrade others, to magnify and exalt themselves.

20. Men of *Eminence* are daily degraded by Persons of no Reputation.

21. *Fame* exceeds a common Reputation as much as our *whole planetary System* exceeds the *Spot* inhabited by a single Defamer.

22. The false and pernicious Report of a *Backbiter* does Injury unperceived and unawares; destroying some in the good Opinion of others, to whom they are even unknown.

23. The *Blots* of Defamation by *Backbiters*, when *artfully* managed, with a Shew of *Probability*, are difficult to wash out; but *palpable* Falshoods asserted can make no *Stain*.

24. An *Acknowledgement* of a *Slander*, artificially spread abroad, is not always a Cure for an injured Reputation; because the Acknowledgement seldom or never reaches all the Persons and Places where the Poison was first spread: Against which *Poison* the only Remedy is a *public* Antidote.

25. *Fame* differs exceedingly, in Extent, from *Reputation*.

26. *Reputation* is the Property of private Persons of *middling* Merit only.

27. *Fame* moves in a vast Circumference, and belongs to Men of exalted Talents and Acquisitions.

28. *Fame*, the Product of *extraordinary* Worth, or Merit, is confirmed to the Owner by the concurring Testimonies of Mankind, and of Persons yet unborn. It is augmented by revelling Time.

29. The Sphere of *Reputation* is commonly circumscribed within the Territories of a Man's Acquaintance.

30. *Fame* is boundless; it reigns where the Owner of it never was, and perhaps never will be.

31. *Fame* differs from *Reputation* in Extent of Duration.

32. *Reputation* belongs to the *Living* only, expiring soon after the Owner's Death. It is gained by Men in their Life-Time, from their worthy Actions and Conduct in the Opinion of others.

33. *Fame* is not terminated with Life; but is increased and propagated, after Death, through a Succession of Ages; as is testified by Men of the *first Rate* Merit and Distinction.

Mr.

Mr. Emerson's little concealed and imperceptible Adversaries will be contented by Time, and be forgot like buzzing Insects that live but for a short Season,

To the PALLADIUM-AUTHOR, on his Mechanical and Universal
RULE OF PROPORTION, at Pages 54, 55, Palladium 1771.

"SIR,

"It is with Pleasure I can say there is more new Matter contained in the above-mentioned two Pages than in all the Books of common Arithmetic I have seen for these 10 Years. I don't know that I have seen this Rule's Equal: The more I use it, the more Pleasure it gives me. Had I been the Author of that single Rule, it would have given me more real Pleasure than publishing all the Compilations of Arithmetic extant; which shews there is yet Room for Improvement of common Arithmetic. This Rule has rendered the most difficult Part of Arithmetic the most easy. In teaching it to my Scholars, I intend to make it go Hand-in-Hand with the common Method, by Way of Comparison, to shew the Difference.

W. HARDY."

"Cottingham-School, near Hull,

"Jan. 5, 1772."

A Specimen of further Improvement in arithmetical Rules, for the Use of Schools.

To number any Number of Figures mechanically.

Divide the Figures from Right to Left into Threes, by a Comma and a Period, alternately, writing 1 over the Figure to the Left of the 1st Point, 2 over the Figure to the Left of the 2d Point, 3 over the Figure to the Left of the 3d Point, &c. till all the Figures next all the Points to the Left are over-written: Then number every 3 Figures to the Right of every Comma as Hundreds, (with Tens, Units) and every three Figures to the Left of every Comma as Thousands, (with Tens, Units,) of the Denomination under which they stand; denoted by 1, signifying Millions; 2, Billions; 3, Trillions; 4, Quadrillions; 5, Quintillions; 6, Sextillions; 7, Septillions; 8, Octillions; 9, Nonillions; 10, Decillions; &c. Thus,

5 th 4 th 3 th 2 th 1 th
123.456,789.876,543.212,345.678,987.654,321

In Periods of 6 Figures.

One hundred and twenty-three Quintillions;

Four hundred and fifty-six thousand, seven hundred and eighty nine Quadrillions;

Eight hundred and seventy-six thousand, five hundred and forty-three Trillions;

Two hundred and two thousand, three hundred and forty-five Billions;

Six hundred and seventy-eight thousand, nine hundred and eighty-seven Millions;

Six hundred and fifty-four thousand, three hundred and twenty-one.

It is found by Experience, that Youth, being once taught to number Figures, as Hundreds, may number any Number of Figures whatsoever, by the above mechanical Rule; and being thus at once qualified in common Numeration, they may proceed through Addition, by first getting by Heart an Addition-Table for the Purpose; and through common Subtraction, by taking each lower Number from 10, and adding the upper to the Remainder, when the lower Number cannot be taken from the upper, carrying an Unit to the next, instead of first adding 10 to the upper Number; then through Multiplication, having first learnt the Multiplication-Table by Heart; and so through Division; when, and not before, Addition and Subtraction, of different Denominations, are best taken in Hand, without any Pence-Table, (the old exploded practice.) Pence-Tables might as properly be made for Avoirdupois and Troy Weight, Weights and Measures, and for other different Denominations, as Pence only: Whereas stopping by Points, at every inferior Denomination, to be carried to the next higher Denomination, and setting down the Residue, is a Method far more expeditious and easy, for qualifying the Learner than the Method of engaging with compound Additions and Subtractions before Multiplication and Division are undertaken. — See our New, short, practical, and mechanical Rules of Arithmetic, to be published by Mr. Steel, on Little-Tower-Hill.

Mr. John Ross, of *Portsmouth*, who is an expert Mathematician, has taught the Principles of *this Method* with Success, for many Years, and has put his Scholars very forward thereby, in a short Time: Who has published an useful arithmetical Work, entitled, *The INSTRUCTOR'S ASSISTANT*; being a Compendium of Arithmetic, practical and theoretical. — To be had of the Author, at *Portsmouth*, or of the Booksellers.

Our Correspondent, Mr. T. Sadler, of *Whiteburch, Shropshire*, informs us that he is about publishing, by Subscription, *A System of practical Arithmetic, vulgar and decimal*, on an entire new Plan: Likewise *The Muses Cabinet, or Delights for the Ladies*; with a second Part, entitled, *Arithmetical Recreations for the Ingenious*: Price 1s. As also, at the same Time, a Poem, entitled, *The Harvest-Field*: Price 6d. The Places of Subscription are mentioned in his printed Proposals and Advertisement.

Mr. Bourne's Plan of Surveying, by the Chain and Pen only, contradicts all general and established Methods, by improved Instruments and accurate angular Dimensions, (without which inaccessible Distances cannot be had,) and therefore will gain no Credit.

To sum any Kind of GEOMETRICAL PROGRESSION, finite or infinite.

IN any geometrical Progression, where $a = 1^{\text{st}}$ Term, $r = \text{Ratio}$, $l = \text{last Term}$, $n = \text{Number of Terms}$, $s = \text{Sum of Terms}$,

$$a, ar, ar^2, ar^3, ar^4, \&c. \text{ to } ar^{n-1} = l.$$

Lemma 1. As $1 : r :: s - l : s - a$. Whence, $s - a = rs - rl$, and $s =$

$$\frac{a - rl}{1 - r} = \frac{a}{1 - r}, \text{ when } l = 0; \text{ summing an infinite decreasing Progression;}$$

but the former Expression sums a finite one, (increasing or decreasing,) when $s = \text{given Number}$.

Lemma 2. As $1 : r^{n-1} :: a : l$. Whence, $l = ar^{n-1}$. Hence all Conditions of a geometrical Series are solved, when $n = \text{a finite Number}$.

Let $a = 10$, $r = \frac{9}{10}$, $l = 0$, then $\frac{a}{1 - r} = \frac{10}{1 - \frac{9}{10}} = \frac{100}{1} = 100$ exactly, the Sum of an infinite decreasing geometrical Progression, required.

N. B. If the Series be inverted $a = 0$, $l = 10$, then $s = \frac{a - rl}{1 - r}$ becomes

$$\frac{rl - a}{r - 1} \text{ (by changing the Signs) where } r = \frac{10}{9}. \text{ Hence } \frac{10}{9} \times 10 \div \frac{10}{9} - 0 = \frac{100}{9} \div \frac{1}{9} = 100, \text{ the same as before; without the Trouble used by}$$

Mr. Jones, that ingenious Mathematician, in his *Synopsis Palmariorum*, p. 203.

PALLADIUM-AUTHOR.

N. B. If our new, short, practical, and mechanical, Rules of Arithmetic, are approved, for the speedily and perfectly qualifying all Learners in the Arithmetic Arts, the Public shall be supplied with a *Short Latin Grammar*, (encouraging the same by Subscription also to the same Place) for qualifying Youth in that Language in the easiest Manner and shortest Time possible. Price 1s. to be paid for when the Grammar is published.

* * Such Readers and Correspondents as are desirous of our New, short, practical, and mechanical Rule of Arithmetic, for qualifying Youth in the shortest Time possible at School, or under a private Tutor, are desired to send their Names and Subscriptions to Mr. Steel, Bookseller, on *Little-Tower-Hill, London*; 1 Shilling only to be paid for each Book, when published.